CENTER FOR PUBLIC SAFETY MANAGEMENT, LLC

COMPREHENSIVE FIRE DEPARTMENT STUDY

OTTAWA FIRE DEPARTMENT
OTTAWA, KANSAS

FINAL Report-October 2023

CPSM®

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ICMA

Exclusive Provider of Public Safety Technical Services for
International City/County Management Association

THE ASSOCIATION & THE COMPANY

INTERNATIONAL CITY/COUNTY MANAGEMENT ASSOCIATION (ICMA)

The International City/County Management Association (ICMA) is a 109-year-old, non-profit professional association of local government administrators and managers, with approximately 13,000 members located in 32 countries.

Since its inception in 1914, ICMA has been dedicated to assisting local governments and their managers in providing services to their citizens in an efficient and effective manner. ICMA advances the knowledge of local government best practices with its website, www.icma.org, publications, research, professional development, and membership.

CENTER FOR PUBLIC SAFETY MANAGEMENT (CPSM)

The ICMA Center for Public Safety Management (ICMA/CPSM was launched by ICMA to provide support to local governments in the areas of police, fire, and Emergency Medical Services.

The Center also represents local governments at the federal level and has been involved in numerous projects with the Department of Justice and the Department of Homeland Security. In 2014, as part of a restructuring at ICMA, the Center for Public Safety Management (CPSM) spun out as a separate company and is now the exclusive provider of public safety technical assistance for ICMA. CPSM provides training and research for the Association's members and represents ICMA in its dealings with the federal government and other public safety professional associations such as CALEA, PERF, IACP, IFCA, IPMA-HR, DOJ, BJA, COPS, NFPA, etc.

The Center for Public Safety Management, LLC, maintains the same team of individuals performing the same level of service that it had for ICMA. CPSM's local government technical assistance experience includes workload and deployment analysis using our unique methodology and subject matter experts to examine department organizational structure and culture, identify workload and staffing needs, and identify industry best practices.

We have conducted more than 400 such studies in 46 states and provinces and more than 275 communities ranging in population size 3,300 (Lewes, DE) to 800,000 (Indianapolis, IN).

Thomas Wieczorek is the Director of the Center for Public Safety Management.
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SECTION 1. EXECUTIVE SUMMARY

The Center for Public Safety Management, LLC (CPSM) was retained by the City of Ottawa to conduct an Operational and Administrative Analysis for its fire department, which included:

- A detailed review of department operations.
- The department's interaction with Franklin County EMS.
- The department's workload, staffing, and deployment practices.
- An analysis of fire stations and fire apparatus.

This analysis includes a thorough review of the organization structure, training, performance measures, and prevention activities; an analysis of the city's fire station locations; and an evaluation of the co-utilization of fire stations with Franklin County EMS. Specifically, CPSM was tasked with providing recommendations and alternatives regarding fire department operations, staffing levels, and alternative modes of operation for current service demand and in terms of options that can best position the department to respond to potential future growth in the community.

CPSM analyzed performance data provided by the Ottawa Fire Department (OFD) and also conducted a firsthand examination of the department's operations. Fire departments tend to deploy resources utilizing traditional approaches, which are rarely reviewed. To begin the review, project staff asked for certain documents, data, and information. The project staff used this information/data to familiarize themselves with the department's structure, assets, and operations. The provided information was supplemented with information collected during an on-site visit to observe the performance of the department and to compare that performance to national benchmarks. CPSM will typically utilize benchmarks that have been developed by organizations such as the National Fire Protection Association (NFPA), Center for Public Safety Excellence, Inc. (CPSE), the ICMA Center for Performance Measurement, as well as others.

Project staff conducted a site visit on May 2-4, 2023, for the purpose of observing fire department and agency-connected support operations, interviewing key department staff, and reviewing preliminary data and information. Telephone and video conference calls as well as email exchanges were conducted between CPSM project management staff, the city, and the fire department so that CPSM staff could affirm the project scope, and elicit further discussion regarding this analysis.

The Ottawa Fire Department (OFD) is the only career fire department in Franklin County. Though OFD is a relatively small organization with limited resources, it is highly proficient in managing its workload. OFD relies heavily on the recall of off-duty personnel, its volunteer workforce, and mutual aid partners (primarily from neighboring volunteer agencies) in meeting service demand. OFD works closely with Franklin County EMS, a county-based EMS agency, that is the sole provider of advanced life support services (ALS) and ambulance transports throughout the county. The OFD personnel with whom CPSM interacted demonstrated a profound work ethic and a commitment to excellent customer service. However, OFD has limited resources and as service demands continue to escalate, OFD will be required to expand its response capabilities. The challenges in Ottawa are not unique nor are they insurmountable. CPSM will provide a series of observations and recommendations that we believe will support OFD in fulfilling its mission in providing both emergency and nonemergency response.

RECOMMENDATIONS

The Ottawa Fire Department is currently providing a range of excellent services to its citizens, local businesses, the university, and visitors to the area. The department is well-respected in the community and by city leadership. In our evaluation we often recognize the department when we observe exceptional service or a level of proficiency that stands out. In these situations, we recognize the departmental efforts as a ***Best Practice.*** However, the OFD is limited in its capacity to provide the range of services needed and will be unable to meet any future growth in service demand without considerable expansion. Though the Ottawa Fire Department and its leadership are continually seeking service alternatives that allow its personnel to provide services as safely and efficiently as possible, it is essential that efforts be taken to expand the overall operational and administrative capacity of this organization.

Twenty-nine recommendations are listed below and are also found in applicable sections within this report. The recommendations are based on best practices derived from the NFPA, CPSM, ICMA, the U.S. Fire Administration, the International Association of Emergency Managers (IAEM), and the Federal Emergency Management Agency (FEMA).

These recommendations are listed in the order in which they appear in the report.

Kelly Days and Workweek

(See pp. 9-13.)

1. The city should hire an Administrative Assistant to provided added clerical, administrative and financial record-keeping support within the Fire Department.
2. The city should eliminate the Kelly Days for Operations staff and move to a payment of these hours worked as overtime in order to increase on-duty minimum staffing.
3. The city should re-assign the current floating firefighter position to a permanent shift assignment and use this additional person to help increase the on-duty minimum staffing level from four to five personnel.
4. The city should hire two additional firefighters in order to increase on-duty minimum staffing from four to five personnel.
5. Ottawa should revise its interpretation of "time worked" when considering overtime eligibility for fire personnel and exclude any sick leave or FMLA leave time taken as hours worked.

Alternative Response vehicles

(See pp. 13-14.)

6. The Ottawa Fire Department should consider the use of EMS squad units to handle EMS and non-fire related service calls in the city's service area.

Staffing and Deployment

Program Management Responsibilities

(See pp. 15-17.)

7. OFD should consider the expansion of program management duties for field personnel and utilize these assignments to enhance career development and subsequently consider successful fulfillment of these duties as a factor in the promotional process.

Promotional Process

(See pp. 17-20.)

8. OFD should consider expanding the promotional requirements for Driver, Lieutenant, Captain, and Assistant Chief to include specific college coursework and degrees in the areas of Fire Science and Fire Administration or related fields of study.
9. OFD should move to a regular testing process for all promoted positions (Driver, Fire Lieutenant, Fire Captain, and Assistant Chief). These testing processes should be specified in written policy, clearly identifying the components and weighting of the elements involved in the testing processes.
10. OFD should formalize the step-up process for all promoted positions and use the existing promotional lists to determine eligibility for step-up assignments.

Performance Reviews
(See pp. 20.)

11. OFD should provide a direct link to the employee performance review process and utilize these appraisals as a key component when considering employee promotions.

Fire Incident Reporting Review
(See pp. 21.)

12. The Ottawa Fire Department should institute a Quality Assurance-Quality Improvement (QA/QI) review process for its fire incident reporting.

Fire Station Facilities

(See pp. 21-30.)

13. The Ottawa Fire Department should work with Franklin County EMS in developing a feasibility study to expand and improve the station facilities utilized in their co-location arrangement.

Fleet Management

(See pp. 31-34.)

14. The city's Fleet Management Division should institute a work-order tracking system that is fully automated and that provides comprehensive records on all work done to vehicles, along with repair status and the associated costs.
15. The city should institute a fire apparatus replacement fund that provides annual contributions towards the replacement of this equipment on the basis of its expected service life.

Fire Risk Analysis

(See pp. 36-40.)

16. The Ottawa Fire Department should conduct a formal fire risk assessment that concentrates on the city's downtown, strip commercial establishments, big-box occupancies, high-rise structures, and industrial, processing, and institutional properties.

Accreditation

(See pp. 43-44.)

17. Ottawa should consider working toward CPSE Fire Accreditation in the future.

Fire Response Protocols

(See pp. 47-54.)

18. Ottawa should consider the creation of a cadre of Reserve Fire and EMS personnel to supplement staffing levels for structure fires, larger events, and disaster situations.

EMS Response

(See pp. 55-57.)

19. OFD should work with the Emergency Communications Center to implement response protocols that alter the OFD response mode when calls are determined to be minor or non-emergency.

Performance Measurement

(See pp. 76-79.)

20. OFD should implement a series of performance measures that enable ongoing review of service outcomes. The process of developing these measures should utilize input from OFD members, the community, the City Commission, and City Administration.

Fire Prevention and Code Enforcement

(See pp. 80-81.)

21. OFD should implement an internal recordkeeping process for all fire prevention activities including fire inspections, plans review, special permitting, public education, and fire investigations.
22. The City of Ottawa should implement fire plans review, inspection, and permitting fees in order to recover the full cost of providing these services in the community.

Education and Training

(See pp. 83-85.)

23. The Ottawa Fire Department should consider the utilization of the Task Book process in fulfilling probationary requirements for new firefighters and in the demonstration of needed competencies or experience to qualify for promotional opportunities.
24. The Ottawa Fire Department should institute written and practical skills testing as part of the department's annual fire training plan.

Emergency Management

(See pp. 86-88.)

25. The city of Ottawa should work with Franklin County Emergency Management to update the County Emergency Operations Plan (CEOP).
26. The City of Ottawa should initiate an effort with Franklin County Emergency Management to establish a joint County-City Emergency Management Leadership Team to support planning and operational assignments in the emergency management process.
27. The City of Ottawa should designate a City Emergency Manager from a key department (Police, Fire, or the City Manager's Office), who is responsible for implementing the city's emergency planning and coordination efforts in cooperation with Franklin County.
28. The City of Ottawa should initiate an effort in which every city department develops and exercises a Continuity of Operations Plan (COOP).

Emergency Communications Center

(See pp. 88-89.)

29. The City of Ottawa should explore its options to provide supplemental funding to the Franklin County Emergency Communications Center in order to improve staffing levels and the number of dispatch circuits as identified in the City's most recent ISO review.

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SECTION 2. SCOPE OF PROJECT

The scope of this project was to provide an independent review of the services provided by the Ottawa Fire Department (OFD) so that the Mayor, City Commissioners, and other city officials, including officials of OFD, could obtain an external perspective regarding the city's fire and EMS delivery system. This study provides a comprehensive analysis of the OFD, including its organizational structure, workload, staffing, station locations, overtime, deployment, use of volunteer personnel, training, fire prevention, emergency communications (911), planning, and public education efforts.

In addition, CPSM will provide its insights to help the department determine the appropriateness of the level of response and alternative delivery systems that could be utilized in meeting both current and projected service demands. Local government officials often commission these types of studies to measure their department against industry best practices. In this analysis, CPSM provides recommendations where appropriate, and offers input on a strategic direction for the future.

Key areas evaluated during this study include:

- Fire department response times (using data from the city's computer-aided dispatch system and the OFD records management system).
- Deployment, station locations, staffing, and overtime.
- Volunteer firefighters and their utilization.
- Agency interaction with Franklin County EMS, Franklin County Emergency Communications, and mutual aid partners.
- Organizational structure and managerial oversight.
- Fire and EMS workloads, including unit response activities.
- OFD support functions (Training, Fire Prevention/Code Enforcement, Emergency Management, Fleet Services, IT, Human Resources, etc.).
- Essential facilities, equipment, and resources.
- An evaluation of the capacity of the organization to best position itself in meeting anticipated demand.

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SECTION 3. ORGANIZATION AND MANAGEMENT

GOVERNANCE AND ADMINISTRATION

Ottawa is the county seat of Franklin County. The city is located in the east-central portion of Kansas, approximately 25 miles south of Lawrence and about 50 miles southwest of Kansas City. The city is located at the juncture of Interstate 35 and Hwy 59.

Ottawa is a relatively small community that has not experienced significant growth in recent years. In 2020, the U.S. Census estimated the population to be 12,625. Since 2000 the city's population has grown by about 700 people. The city is generally rural in nature, with much of the economy associated with agriculture, services, and retail sales. The city's proximity to Kansas City and the University of Kansas in Lawrence present a potential for accelerated growth in the future. In addition, recent expansion of semiconductor manufacturing and computer chip and battery plants in neighboring counties could offer potential expansion into the Franklin County-Ottawa area. The corporate limits of the city encompass a land area of approximately 10.4 square miles. Ottawa is also the home of Ottawa University, a private Baptist intuition with a student enrollment estimated at more than 850 on its Ottawa campus.

Ottawa is a chartered municipal government within the State of Kansas, operating under a city commission-manager form of government. The five Commissioners are elected at-large for either four-year or two-year terms. General elections are held every two years for those Commissioners whose terms are expiring. The City Commission is composed of five members and each year the Commission selects its mayor and mayor pro tem, who each serve in these posts for one year. The mayor presides at Commission meetings and votes on issues as a member of the Commission to effectuate decisions. The City Commission appoints the City Manager, who is the administrative officer for the city with the authority to hire, appoint, and remove all employees of the local government. The City Commission serves as the legislative body for the city. The City Commission is responsible for enacting laws that govern the city, adopting the annual budget, and appropriating funds to provide city services. Most transactions require only a quorum or simple majority be present.

Ottawa is typical of many cities and towns across the United States in that it operates its own municipal court, a public works department, community development, parks and recreation, utilities and several internal functions including finance and human resources. Ottawa operates its own police and fire departments. Emergency 911/dispatch services are provided by Franklin County Emergency Communications. The Ottawa Fire Department responds jointly with Franklin County EMS in providing emergency medical services. The city operates the Ottawa Municipal airport, a general airport facility with a Fixed Base Operator who is contracted by the city.

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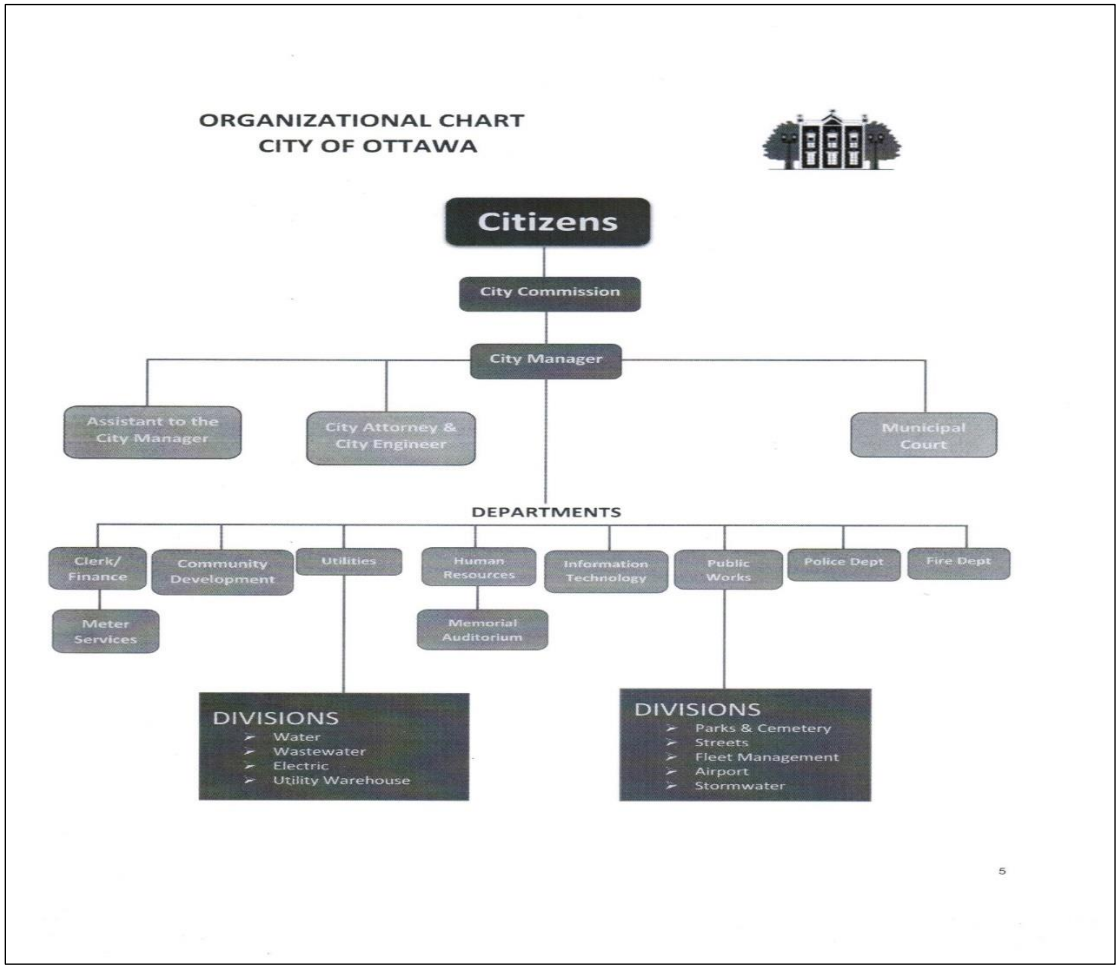
FIGURE 3-1: City of Ottawa Table of Organization



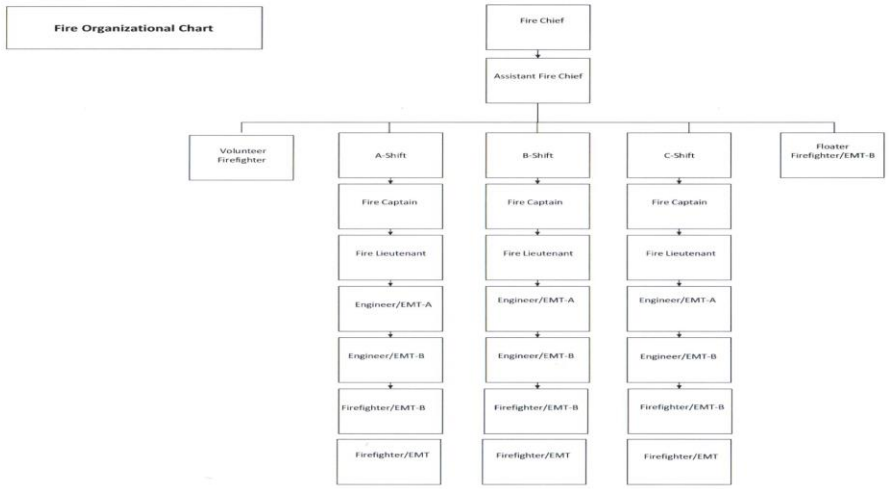
OTTAWA FIRE DEPARTMENT OVERVIEW

The Ottawa Fire Department (OFD) is a combination fire department comprised of 21 career personnel and 6 volunteers. The Fire Chief has overall responsibility for managing the department's day-to-day operations and providing administrative oversight. The Fire Chief is assisted by an Assistant Chief who has primary responsibilities as the Fire Marshal in charge of fire plans review, inspections, and permitting. The Operations Division includes 19 line personnel who are assigned to the city's two fire stations. These stations serve the city along with providing assistance to neighboring areas in Franklin County through a mutual aid agreement. The department's training activities, logistical support, administrative services, fire prevention and the coordination of volunteers are under the supervision of the Fire Chief and Assistant Chief.

OFD has limited clerical and administrative support. All administrative record-keeping, payroll, training record-keeping, purchasing and policy directives are produced and managed by either the Fire Chief or Assistant Chief. CPSM believes that the addition of an Administrative Assistant is warranted given the number of employees in the organization, the degree of official recordkeeping required and internal support functions of the organization.

Recommendation: The city should hire an Administrative Assistant to provided added clerical, administrative and financial record-keeping support within the Fire Department. (Recommendation No. 1.)

FIGURE 3-2: Ottawa Fire Department Table of Organization



The Operations Division is broken into three shifts, with a 24-hour field supervisor (Fire Captain), assigned to each shift with the responsibility for supervising field operations, scheduling, and personnel matters on their respective shifts. Fire Captains are assigned to Engine 1, housed at Station #1. A Fire Lieutenant is typically assigned at Station #2. Operations is responsible for providing the department's emergency response functions for a wide array of fire, rescue, and emergency medical services. From its two fire stations, when staffing permits, the department operates two engines, one at each station. OFD has a minimum staffing policy that maintains four people on-duty at all times. ***Typical staffing includes three personnel at Station #1 and only one person operating from Station #2.***

During the one-year period of this study from January 1, 2022, through December 31, 2022, the OFD responded to 2,053 incidents, of which 291 were canceled or mutual aid responses (216 and 75, respectively). When canceled and mutual aid calls are excluded, EMS calls accounted for more than 76 percent of the response activities in the Ottawa service area. All personnel are cross-trained and are able to provide emergency medical care as well as structural and wildland fire fighting.

All line personnel must hold a Basic-EMT certification (EMT-B); however, a number of OFD personnel hold EMT-A certifications. An EMT-A is an advanced certification which allows these personnel to provide an expanded scope of service, guided by the county's Medical Director. This expanded scope of care includes the starting of IVs, basic EKG interpretation, airway management, and the administration of certain drugs.

OFD operates in what is often termed a ***two-tiered EMS delivery system***. In this arrangement the fire department provides EMS first response and the county ambulance provider (Franklin County EMS) provides advanced life support services and ambulance transport.

In addition to their emergency response duties, emergency services personnel also provide a wide range of customer service and community outreach efforts, including blood pressure

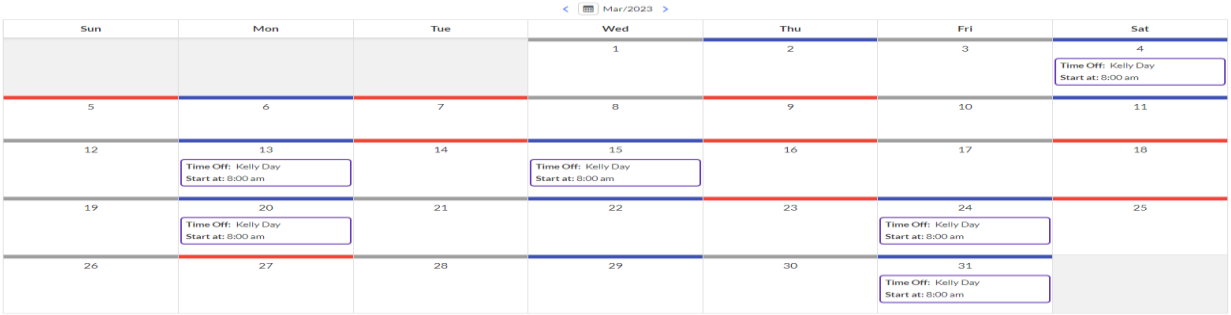
screenings, tours of fire stations and apparatus, smoke detector installations, and fire and life safety presentations.

Kelly Days and Workweek

The work schedule in Ottawa is quite erratic and confusing to explain. Ottawa has chosen to pay its fire personnel on a 28-day pay cycle. Overtime guidelines relating to municipal fire personnel are specified in the Fair Labor Standards Act (FLSA) and the "***7(k) exemption,***" which allows municipal fire personnel to work up to 53 hours each week before an overtime premium is required.[1] In the 28-day pay cycle, FLSA specifies that overtime be paid for all hours worked in excess of 212 hours (53 hours per week times four weeks).

Under the current work plan in Ottawa, operations personnel work in a three-platoon system in which personnel are on duty for 24 consecutive hours followed by 24 hours off. This shift of employees returns to work after their off period and then works a second 24-hour shift, which again is followed by another 24 hours off. This crew will work a third 24-hour duty-day; however after this tour they receive 96 hours off. In this rotation one of the shifts works a total of 240 hours during the 28-day pay cycle (ten 24-hour shifts) and the other two shifts each work 216 hours (nine 24-hour shifts).

In an effort to reduce the hours worked and the FLSA overtime paid, Ottawa will give its shift personnel a day off without pay (24-hours) in each 28-day pay cycle when they are on the shift that is scheduled to work 10 shifts (240 hours). These off-duty days are often referred to as "***Kelly Days***." Again, depending on the starting and ending dates of the pay cycle, one of the shifts receives a Kelly day in that cycle, while the other two shifts work their scheduled nine shifts without receiving a Kelly day. Throughout the course of one year as the work schedule progresses through the 28-day cycles, one shift receives five Kelly days while the other two shifts receive four. As the 28-day pay cycle progresses over several years the number of Kelly days will balance across the different shifts. In addition to the issuance of Kelly days, all personnel receive four hours of overtime pay each 28-day pay cycle to reflect the 216 hours worked (four in excess of FLSA 212-hour guidelines).



Because of the limited number of on-duty personnel at any given time in Ottawa, usually four personnel, ***CPSM believes that additional staffing is warranted in managing the daily call activities and in providing a safe work environment***. Staffing of individual apparatus and minimum daily staffing levels are perhaps the most contentious aspects of managing fire operations in the U.S.

The U.S. Occupational Safety and Health Administration (OSHA) has issued a standard that has been termed the ***"Two-In/Two-Out"*** provision. This standard affects most public fire departments

1. See 29 USC §207(k).

across the U.S., including the OFD. Under this standard, firefighters are required to operate in teams (of no fewer than two personnel each) when engaged in ***interior structural firefighting.*** The environment in which interior structural firefighting occurs is further described as areas that are immediately dangerous to life or health (an IDLH atmosphere) and subsequently require the use of self-contained breathing apparatus (SCBA). When operating in these conditions, firefighters are required to operate in pairs and they must remain in visual or voice contact with each other and must have at least two other employees located outside the IDLH atmosphere. This assures that the "***two-in***" can monitor each other and assist with equipment failure or entrapment or other hazards, and the "***two-out***" can monitor those in the building, initiate a rescue, or call for back-up if a problem arises.[2]

This standard does not specify staffing on individual apparatus, but rather specifies a required number of personnel be assembled on-scene when individuals are in a hazardous environment. There is, however, a provision within the OSHA standard that allows two personnel to make entry into an IDLH atmosphere without the required two back-up personnel outside. This is allowed when they are attempting to rescue a person or persons in the structure before the entire team is assembled.[3]

A second factor that contributes to the staffing debate is the National Fire Protection Association (NFPA) 1710 publication, *Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments (2020 Edition, Sec. 5.2.2.)*. This standard specifies that the staffing level on responding engine and ladder companies be established at **a minimum of four on-duty personnel**. Unlike the OSHA guideline, which is a mandatory provision, the ***NFPA 1710 guideline is advisory***, meaning that communities (including Ottawa) are not required to adhere to this NFPA guideline. NFPA 1710 also provides guidance regarding staffing levels for units responding to EMS incidents; however, the provision is less specific and does not specify a minimum staffing level for EMS response units. Instead, the standard states; "*EMS staffing requirements shall be based on the minimum levels needed to provide patient care and member safety.*"[4]

The typical Ottawa staffing pattern places three personnel on Engine #1 and one person on Engine #2 (a total of four on-duty personnel). When Engine #1 is the first arriving unit at a structure fire, the Fire Captain and the assigned Firefighter will make entry into the structure while the Driver Engineer, stays with the engine and provides water for firefighting. Upon arrival of the second engine (Engine #2), with only one person assigned, ***the city is technically in violation of the OSHA guidelines in that two personnel are not available for making entry as a back-up unit to the first arriving crew that is engaged in firefighting. In addition, when Engine#2 is dispatched to a call as a single person unit, the assigned personnel is restricted from making entry into a hazardous environment as a single-person crew.***

CPSM believes that the city should increase the on-duty staffing of personnel so that a minimum of five personnel will be on-duty at any given time. This will allow an initial entry team of two personnel along with a back-up team of two personnel and a fifth person assigned to operate and monitor engine operations and to provide outside communications. One step in increasing on-duty staffing is to eliminate the Kelly Days. By eliminating time off for the Kelly days (an estimated 1,872 hours annually) and paying personnel for this additional time worked (an estimated $60,000 annually), on-duty staffing will be increased to the recommend minimum of

2. OSHA-Respiratory Protection Standard, 29CFR-1910.134(g)(4).
3. Ibid, Note 2 to paragraph (g).
4. (NFPA) 1710, *Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments* (2020 Edition Sec., 5.3.3.2.2.).

five personnel approximately 78 additional days each year, or roughly two-thirds of the time on one shift.

Recommendation: The city should eliminate the Kelly Days for Operations employees and move to a payment of these hours worked as overtime in order to increase on-duty minimum staffing. (Recommendation No. 2.)

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Ottawa also maintains a floating assignment for one firefighter. This person is moved among the various shift assignments to cover the absences that are caused primarily by Kelly days. CPSM believes that this person should be moved to a permanent shift assignment and to provide an additional person for minimum staffing. The reassignment of the floating position will be another step, with no additional cost, to increase the daily minimum staffing from four to five personnel.

Recommendation: The city should re-assign the current floating firefighter position to a permanent shift assignment and use this additional person to help increase the on-duty minimum staffing level from four to five personnel. (Recommendation No. 3.)

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Eliminating the time-off for Kelly days and moving the floating assignment to a permanent shift assignment will cover more than half of the time needed to increase minimum staffing from four to five personnel. CPSM believes that this is a major issue that should be addressed in Ottawa. As well, we believe that the city should hire two additional personnel in order to have sufficient staffing to increase on-duty minimum staffing from four to five personnel.

Recommendation: The city should hire two additional firefighters in order to increase on-duty minimum staffing from four to five personnel. (Recommendation No. 4.)

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A total of five fire personnel on duty in the city of Ottawa is not excessive and can be easily justified by the current workload and from a safety perspective. In addition, OSHA guidelines for fire personnel operating in a hazardous environment requires the use of a buddy system (personnel operating in pairs) and sufficient staffing to allow a separate rescue crew of two people to make entry if needed. Ideally the city should operate with two engine companies each staffed with a minimum of three personnel. Moving incrementally from four-person minimum staffing policy to five-person minimum staffing is a logical and needed step.

Definition of Time Worked

As stated earlier, overtime guidelines relating to municipal fire personnel are specified in the Fair Labor Standards Act (FLSA) and its "***7(k) exemption.***" FLSA requires that overtime pay is required only when the actual hours worked are in excess of the designated pay cycle. FLSA does not require that this calculation include time not worked, such as vacation time, sick leave, or holidays (federal or otherwise).[5] Ottawa considers sick leave and FMLA as time worked. CPSM believes that the city should pursue the exclusion of sick leave and FMLA leave in determining eligibility for overtime pay during the FLSA work cycle.

5. U.S. Department of Labor, Wage and Hour Division, Overtime Pay: General Guidance.

Recommendation: Ottawa should revise its interpretation of "time worked" when considering overtime eligibility for fire personnel and exclude any sick leave or FMLA leave time taken as hours worked. (Recommendation No. 5.)

The exclusion of these leave types in considering overtime eligibility is consistent with FLSA guidelines and fully compliant with the legal requirements imposed by this legislation. In addition, by excluding sick leave and FMLA when considering overtime eligibility, there will be a secondary effect in reducing absenteeism, as employees often chose not to call in sick if it results in a loss of overtime premium pay.

Alternative Response Vehicles

EMS calls are the predominant workload for the Ottawa Fire Department, accounting for more than 76 percent of its call activity, with an estimated 1,572-unit responses annually. As well, the OFD responds to more than 600 requests annually for other incidents in which no fire is present. These call types typically involve public assists, good intent requests, and system malfunctions. In total, CPSM estimates that ***OFD units are responding an estimated 2,000 times annually to calls that do not involve actual fires***.

OFD handles all of its emergency and non-emergency responses primarily with its two-fire apparatus. This workload puts considerable wear and tear on these heavy vehicles. CPSM estimates the combined service miles traveled annually by the OFD fleet is in the range of 12,000 to 13,000 miles, with its busiest unit (Engine 2) amassing as much as 6,000 miles annually.

Fire apparatus are extremely expensive vehicles to purchase and maintain. Engines have a replacement cost of more than $750,000 and ladders are more than $1.7 million. In addition, each engine and ladder must be outfitted with various tools, equipment, EMS supplies, radios, computers, and other equipment that collectively add upwards of $200,000 to the cost of any replacement. Due to the high replacement cost for these vehicles and the ongoing operating and maintenance costs, many agencies have gone to the use of ***alternative response vehicles*** for EMS and non-fire related incidents. Incorporating smaller vehicles into the response fleet helps to reduce the wear and tear on larger vehicles and prolong their useful time in service.

Alternative response vehicles vary in their design and chassis types but generally are commercially available light trucks in a one-ton chassis configuration with either a pick-up or SUV body design. These vehicles are often equipped with after-market outside compartmentation and interior storage areas. Vehicles with these chassis designs are readily available through state bid procurement programs. When equipped with the added compartmentation, 4-wheel drive, lighting, radio systems, and painting, such a vehicle may be acquired for a cost that ranges from $85,000 to $100,000.

FIGURE 3-3: Example of Alternative Response Vehicle

There is a significant cost benefit in utilizing smaller, more fuel-efficient vehicles for Ottawa's more frequent EMS and public service call activity. CPSM estimates that the Ottawa Fire Department is spending in excess of $50,000 annually for the maintenance and repairs of its fleet of engines and ladders. The typical operating and maintenance costs for engines and ladders cost ***five times higher*** than for smaller EMS squad vehicles. In addition, the smaller units are more maneuverable, provide off-road access, and can achieve faster response times than the larger fire apparatus, especially ladder trucks and quints. There is also the benefit of perception in the community when the department responds with an alternative response vehicle to non-emergency or EMS calls rather than larger fire apparatus. Two notable agencies that have taken this approach are Tualatin Valley Fire Rescue, Oregon (***CARS Program***) and the Shreveport Fire Department, Louisiana (***SPRINT Program***).

Squad and SUV-type response vehicles can be expected to be operational for seven to eight years or approximately 100,000 to 120,000 miles in a first-line status. Fire engines and ladder trucks have a longer life expectancy but typically are in need of replacement when odometer readings approach 120,000 to 150,000 miles. Given the economic comparison between engines and alternative response vehicles and the added fact that EMS squads typically are staffed with fewer personnel, it is apparent that from both an economic and operational perspective, the use of EMS squads can provide a cost-effective response option in the Ottawa system.

Recommendation: The Ottawa Fire Department should consider the use of EMS squad units to handle EMS and non-fire related service calls in the city's service area. (Recommendation No. 6.)

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Staffing of individual apparatus and minimum daily staffing levels are perhaps the most contentious aspects of managing fire operations in the U.S. There are a number of factors that have fueled the staffing debate. Aside from FAA requirements for minimum staffing levels at commercial airports***, there are no state or federal requirements for the staffing of structural fire apparatus.***

As stated previously, the on-duty staffing levels in Ottawa are very low and should be increased. Normally the city staffs two units on a daily basis, with a minimum on-duty staffing of four personnel. The following table identifies the number of units and their station assignments for OFD.

TABLE 3-1: OFD Fire Stations, Response Units, and Assigned Personnel

Station #	Response Units	Minimum Assignment
1	1 Engine	3
2	1 Engine	1
2 Stations	**2 Response Units**	**4 on-duty personnel**

Program Management Responsibilities

Many agencies often assign the oversight of program management duties to those staff officers and chief officers who are assigned to 40-hour assignments. CPSM believes it is critical that many of the program management duties required in the operation of a modern fire and EMS organization be delegated to and under the direction of field personnel. In addition, the limited number of non-shift personnel in OFD and the absences of any full-time clerical staff compounds this issue.

OFD has made a number of assignments of support duties to line personnel and this is commendable. However, these assignments are selective and not all officers have been assigned program management duties. The ability to properly manage key organizational duties is beneficial from a career development perspective. In addition, the assumption of program management duties and the effectiveness with which an individual performs in these assignments can be viable considerations in the promotional process. The following table lists a variety of program management duties that could be considered for assignment to field personnel.

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TABLE 3-2: Potential Program Assignment Duties

Program Description	Assignment Level
Promotional Testing	Fire Captain
Performance Appraisals	Fire Captain
Haz Mat/Technical Rescue	Fire Captain
Employee Recognition/Awards	Fire Captain
CISM/EAP	Fire Captain
Sick Leave/Absenteeism Review	Fire Captain
Budget Committee	Fire Captain
Payroll / Executive Time Auditing	Fire Captain
Police Department Liaison	Fire Captain
EMS Protocols	Fire Captain/Lieutenant
Station Maintenance/Upkeep and Supplies	Fire Captain/Lieutenant
Fire Reporting QA	Fire Captain/Lieutenant
Hose Testing	Fire Captain/Lieutenant
Hydrant Testing	Fire Captain/Lieutenant
Radio Programming	Fire Captain/Lieutenant
Mapping	Fire Captain/Lieutenant
Fire Pre-incident Planning	Fire Captain/Lieutenant/Driver
Infectious Disease Control	Lieutenant/Driver
EMS Supplies/Decon/Bio Disposal	Lieutenant/Driver
911 Liaison	Lieutenant/Driver
Station Response Area Designation	Driver
Response Protocols	Fire Captain/Lieutenant
Fire Investigations	Fire Captain/Lieutenant
Safety/Rehab/Risk Management	Driver
SOP/Ops Committee	Fire Captain/Lieutenant/Driver/FF
Fitness Committee	Fire Captain/Lieutenant/Driver/FF
Shift Training Coordinator	Lieutenant/Driver
Recruit Training/Proctoring	Fire Captain/Lieutenant/Driver
Public Information Officer	Fire Captain/Lieutenant
Driver Training/EVOC	Lieutenant/Driver
Fleet Maintenance/Repair Record Keeping	Lieutenant/Driver
Internal Communications/Newsletter	Fire Captain/Lieutenant/Driver/FF
Social Media/FD Web Page	Fire Captain/Lieutenant/Driver/FF
FF/EMS Recruitment Committee	Fire Captain/Lieutenant/Driver/FF
Car Seat Installation	Fire Captain/Lieutenant/Driver/FF
Smoke Detector Replacement	Fire Captain/Lieutenant/Driver/FF
Volunteer FF Liaison	Fire Captain/Lieutenant/Driver/FF
Volunteer FF Training Officer	Fire Captain/Lieutenant/Driver/FF

Recommendation: OFD should consider the expansion of program management duties for field personnel and utilize these assignments to enhance career development and subsequently consider successful fulfillment of these duties as a factor in the promotional process. (Recommendation No. 7.)

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Internal Communication

The ability to communicate work assignments, conduct training sessions, discuss new program initiatives, or merely to update employees on departmental programs or the strategic direction of the organization, requires ongoing outreach, specifically from the Fire Chief, chief officers, and training instructors in the organization. There are a number of communication tools currently available that can be used to conduct video conference calls, training sessions, and information exchanges among multiple work settings (for example, see Zoom™, Microsoft TEAMS™, Microsoft Office™, Skype for Business™, Fires Due™, and Lifesize™, etc.). These tools are inexpensive and, in some cases, the software is free and there are minimal recurring charges. The ability to discuss key department issues along with interactive training sessions is critical to organizational effectiveness and operational readiness. The realities of the COVID-19 pandemic have increased the use of these types of remote meeting and virtual training activities. OFD has become proficient in these applications and should continue and expand their use into the future.

Promotional Process

Career development and professional growth of employees are essential to the sustainability of any organization. Fire service organizations are extremely regimented in terms of personnel issues. As is the case in Ottawa, these processes are guided by personnel guidelines and departmental policy.

The fire service promotional process is normally very competitive, and provides an ideal opportunity to foster the development of individual skills, measure personal initiative, and instill organizational philosophies. The ability to direct an employee's learning effort to develop the needed skill sets is a key function that should be orchestrated through the promotional testing process. This factor is essential in the development of the future workforce and in creating or perhaps changing the culture of an organization. It is essential that an effective promotional process be built around individual performance, personal achievement, and the ability to measure the required skills in a competitive forum.

The OFD promotional processes for company and chief officers are very limited; there are very few pre-requisites for sitting for these exams. OFD relies almost entirely on candidates obtaining Fire Officer 1 and 2 Certifications along with Fire Instructor Certifications. Though these courses are comprehensive and include both written and practical testing requirements, each class is typically obtained in a one-week, 40-hour classroom setting. The city does not require any outside college-level coursework or college degree requirements for either the Fire Lieutenant or Fire Captain positions. The Assistant Chief Position does require an Associate Degree (AS) as a prerequisite for promotions.

Formal ***college education*** is a criterion that CPSM believes should be added to the promotional requirements for the positions of Driver, Lieutenant, Captain, along with expanding the requirements for Assistant Chief. These criteria should be implemented with sufficient advance

notice to employees and should have an implementation date that provides ample time for exiting employees to obtain any new criteria. In addition, the city may consider a "grandfathering provision" that will allow a promotion to take place without meeting the new criteria, but stipulations be established that requires that the criteria be met within a designated timeframe after the promotion is made.

Recommendation: OFD should consider expanding the promotional requirements for Driver, Lieutenant, Captain, and Assistant Chief to include specific college coursework and degrees in the areas of Fire Science and Fire Administration or related fields of study. (Recommendation No. 8.)

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Career development in the fire service should match the level of formal education that is required in other public sector supervisory and managerial positions. This coursework provides timely information and the demonstration of skill sets that are needed in fulfilling these supervisory and management roles in the fire department. It is also important that all college credits or degree requirements specify that coursework be obtained from institutions that have been accredited by a regional or nationally recognized accrediting agency.

TABLE 3-3: Recommended Education Prerequisites for Promotions

Position	Coursework	Credit Hours	Degree Requirement
Driver	Pumping Apparatus/Driver Operator. Fire Service Hydraulics. Building Construction. EVOC. EMT-A.	3 3 3 Certification Certification	
Fire Lieutenant	Driver's Requirements, plus Strategies and Tactics. Industrial Fire Fighting. Wildland Fire Fighting. Fire Inspector I. ICS-300.	9 3 3 3 Certification Certification	
Fire Captain	Lieutenant's Requirements, plus Associate Degree Fire Science or Related. ICS-400.	 Certification	Yes
Assistant Chief	Captain's Requirements, plus Bachelor's Degree.		Yes

Promotional Testing

The promotional processes for Fire Engineer, Fire Lieutenant, and Captain are the most competitive and coveted career advancement processes in the fire service. Even more importantly, these promotional processes provide an exceptional learning environment in which candidates prepare themselves and spend countless hours studying and learning the source materials. From an organizational perspective, there is no better training instrument than the fire service promotional processes. It is untenable to squander this level of personal initiative and diligence in the learning process.

The fire service promotional process should be very structured and directed by written policy. The process must be relevant to the position and the test materials should be updated at frequent intervals in order to properly reflect the latest technology and management systems germane to the position. Most fire departments conduct promotional testing processes at defined intervals. Typically, a test is given and an eligibility list is created so that as vacancies occur, personnel are selected from the established lists. The OFD should develop a departmental policy that specifies the scheduling, test components, their weighting, and the eligibility criteria for the Driver, Fire Lieutenant, Fire Captain, and Assistant Chief positions. CPSM further recommends that promotional tests for each position be held every two years.

Recommendation: OFD should move to a regular testing process for all promoted positions (Driver, Fire Lieutenant, Fire Captain, and Assistant Chief). These testing processes should be specified in written policy, clearly identifying the components and weighting of the elements involved in the testing processes. (Recommendation No. 9.)

The Driver's testing process is much more technical and should be weighted on the basis of practical skills relating to vehicle operations, including driving, vehicle maneuvering, pump practices, and hydraulic calculations in producing various types of fire streams and hose lays. In addition, there should be a test component that allows the candidate to demonstrate their operating skills on the various fire apparatus and associated equipment (portable pumps, fans, generators, etc.). The Engineer testing processes should include a written examination, practical testing, and an oral interview; however, the more significant weighting should be in the areas of vehicle operation and pump practices. We would also recommend that a "Task Book" component be utilized in the interim steps for eligibility to compete in the promotional testing process.

The Fire Lieutenant testing process should focus on tactical skills, leadership, emergency field supervision, administration, computer/technology utilization, and problem solving. Additional focus should be given to a broad-based understanding of fire department policy and procedures, fire prevention, and training. The testing process for Fire Lieutenant should again be in three parts, that is, written, practical, and oral interviews. However, the practical and oral interviews should follow an assessment center format, utilizing role plays, simulations, and presentation skills, all in an effort to home in on the position's critical knowledge, skills, and abilities.

The Fire Captain promotional examination should further emphasize the managerial aspects on command and supervision of the workforce. Again, we would suggest a combination of test components including a written test, oral interview, and a more extensive assessment center process. The focus in this position is on leadership, field command, motivation, planning, organizational skills, time management, and a sound understanding of the organizational mission and performance measurement processes. The promotional testing for Captains should incorporate some budgetary issues, workplace awareness, and questioning that reflects on the political sensitivity of operating and supervising in a public setting.

The most critical aspects of all testing and assessment processes is the relevance of the materials utilized in the testing process and that the process is unbiased and fair to all participants. The use of subject matter experts (SMEs) in the development and administration of these examinations is highly recommended. There is always an uncertainty with regard to the use of SMEs and maintaining the confidentiality of the materials utilized in the testing process. This issue is compounded when those SMEs are also from within the organization. Given the importance of the promotional process and the evolving nature of these positions, we recommend that the

city utilize a contingent of both internal and external SMEs in developing and administering all four promotional processes.

Typically, OFD has only conducted a promotional exam when there is an actual vacancy. CPSM believes that promotional exams for the positions of Driver, Lieutenant, Captain, and Assistant Chief should by conducted every two years and an eligibility list be maintained for all positions and utilized when openings occur and for eligibility for step-up assignments.

> ***Recommendation: OFD should formalize the step-up process for all promoted positions and use the existing promotional lists to determine eligibility for step-up assignments. (Recommendation No. 10.)***

The step-up process provides real-time, on-the-job training, and a valid assessment tool to evaluate candidates in the promotional process. CPSM believes that when employees assume step-up assignments, they should receive a supplemental pay increase for that assumption of additional duties. In addition, we recommend that assessments be done regarding performance of employees in these step-up roles, which ultimately are considered when promotions are made.

Sound leadership and effective supervision are the cornerstones for success in the public safety arena. A fire department and its leaders are tested regularly and often under impactful circumstances. Future leadership must have expanded competencies in the use of technology, honed interpersonal skills, sound judgement, and a broad range of tactical expertise. These skills must be learned and it is essential that the system rewards performance and demonstrated achievement.

Performance Reviews

Closely aligned with the promotional process and equally effective in career development, professional growth, and remediation, is the annual employee performance review. The City of Ottawa and the fire department conduct an annual performance review process for all employees. Annual merit increases are provided on the basis of the level of performance achieved (Meets, Proficient, Exceeds). CPSM believes that the utilization of the performance review process to determine annual merit review pay increases is a ***Best Practice***. However, performance appraisals and the level of achievement reached are not directly considered in the promotional testing process. CPSM believes that the performance review process can be an effective supervisory tool when used effectively. It provides a formal communication and documentation between the supervisor and an employee in establishing goals, monitoring performance, and identifying areas requiring improvement.

> ***Recommendation: OFD should provide a direct link to the employee performance review process and utilize these appraisals as a key component when considering employee promotions. (Recommendation No. 11.)***

As with the successful oversight of program assignment duties, CPSM believes that past performance review scores should have a direct impact on scoring in the various promotional processes. The level of achievement in the most recent performance reviews should provide some type of point allocation in the promotional scoring process. In addition, personnel who receive scores that are less than meeting the job requirements should be excluded from consideration in the promotional process.

Fire Incident Reporting Review

Every response that is carried out by the Ottawa Fire Department is documented by a written incident report. EMS calls utilize a patient care report that documents the date, time, personnel involved, and actions taken in treating the patient along with any related patient information (blood pressure, respirations, level of consciousness, signs and symptoms, injuries etc.). Fire reports identify the date and time of the incident, the occupancy type or location of the incident, the situation found, personnel involved, and the actions taken. These incident reports serve as the official public record and also provide statistical information that can be used to evaluate department activities including workload, response times, fire loss estimates, patient transports, etc.

All EMS reports undergo a comprehensive review for Quality Assurance (Q/A) and Quality Improvements (Q/I). These reviews are done by EMS Coordinators on each shift and the county's Medical Director. Fire reports are typically done by the on-duty Captain, with little or no follow-up or formal QA/QI process.

Recommendation: The Ottawa Fire Department should institute a Quality Assurance-Quality Improvement (QA/QI) review process for its fire incident reporting. (Recommendation No. 12.)

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FIRE STATION FACILITIES

Fire department capital facilities are exposed to some of the most intense and demanding uses of any public local government facility, as they are occupied and in use 24 hours a day, 7 days a week.[6] The Ottawa Fire Department operates out of two fire stations with two staffed emergency response apparatus. Department administrative offices are located at Station #1. Both the Fire Chief and Assistant Chief are assigned command vehicles and will respond to larger incidents when needed. The following table shows the location, year built, and size of the department's stations.

TABLE 3-4: Station Locations, Year Built, and Size

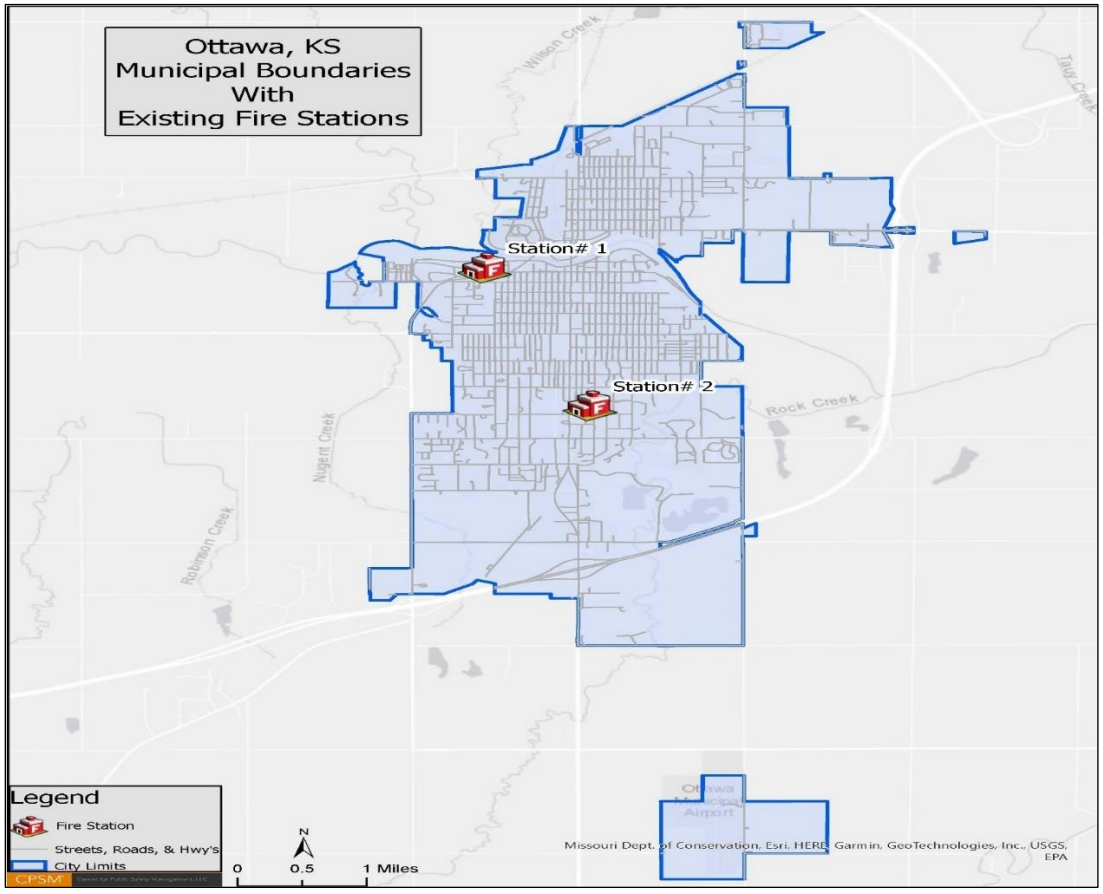
Building	Address	Year Built	Size/Sq. Ft.
Fire Station #1	720 West 2nd Street	1974	13,140
Fire Station #2*	219 East 14th Street	1998	6,252

Notes: *Fire Station #2 is owned by Franklin County

The following figure shows the location of the city's two fire stations and the municipal boundaries of Ottawa.

6. Compton and Granito, eds., *Managing Fire and Rescue Services*, 219.

FIGURE 3-4: City of Ottawa Fire Station Locations



Station Location Analysis

CPSM was asked to conduct a comprehensive review of the OFD fire station locations and provide recommendations regarding the current placement of these facilities, along with their adequacy in housing the necessary personnel and equipment. OFD currently serves a population of 12,625 people and a total service area of 10.4 square miles. This equates to an ***average service area for each fire station of approximately 5.2 square miles***. In addition, both fire stations are co-utilized by the Ottawa Fire Department and Franklin County EMS.

In an FY 2011 *ICMA Data Report*, ICMA tabulated survey information from 56 municipalities with populations under 25,000. In this grouping the average fire station service area was 10.05 square miles.[7] The median service area for this grouping was ***6.32 square miles per fire station***.[8]

In addition, the NFPA and ISO have established different indices in determining fire station distribution. The ISO Fire Suppression Rating Schedule, Section 560, indicates that first-due engine companies should serve areas that are within a 1.5-mile travel distance.[9] The placement of fire stations that achieves this type of separation creates service areas that are approximately

7. "Comparative Performance Measurement," FY 2011 Data Report - Fire and EMS, ICMA Center for Performance Measurement, August 2012.
8. Ibid.
9. Insurance Services Office. (2003) Fire Protection Rating Schedule (edition 02-02). Jersey City, NJ: Insurance Services Office (ISO).

4.5 square miles in size, depending on the road network and other geographical barriers (rivers, lakes, railroads, limited access highways, etc.). The National Fire Protection Association (NFPA) references the placement of fire stations in an indirect way. It recommends that fire stations be placed in a distribution that achieves the desired minimum response times. NFPA Standard 1710, Section 5.2.4.1.1, suggests an engine placement that achieves a 240-second (four-minute) travel time.[10] Using an empirical model called the "piece-wise linear travel time function" the Rand Institute has estimated that the average emergency response speed for fire apparatus is 35 mph. At this speed the distance a fire engine can travel in four minutes is approximately 1.97 miles.[11] A polygon based on a 1.97-mile travel distance results in a service area that on average is ***7.3 square miles***.[12]

From these comparisons, it can be seen that the average 5.2. square-mile service area per station in Ottawa is very consistent with the noted references. Though the city has some response constraints caused by the Marais des Cygnes River and its limited crossings, the ***two-station configuration is providing exceptional response coverage throughout Ottawa***, including the proposed 300-acre business park slated for development in the south end of the city. In addition, the current call volume, including mutual aid calls into Franklin County, is relatively low (only 2,055 total calls annually). This total call activity generated less than 2,500 unit responses or "runs" for all OFD response vehicles. Engine 1, the busiest unit in the city, had fewer than 1,000 runs throughout the year. These are relatively low numbers and it is unlikely that more than two fire stations will be needed in the foreseeable future to properly manage the workload being generated.

The bigger question then becomes the appropriateness of the locations of the existing facilities and their ability to cover the assigned response area with acceptable response times. Given the two-station configuration, we were also asked to evaluate the current station conditions along with their capacity to adequately house the needed vehicles, equipment, and personnel.

Stations are designed to adequately meet the needs of housing apparatus and necessary equipment. Typically, new fire stations have an anticipated service life of 50 years. However, we note that in many jurisdictions older facilities are being replaced in a 30- to 35-year time frame. In most cases facilities require replacement because of their size constraints, a need to relocate the facility to better serve shifting population centers, the absence of needed safety features, or a decision to provide better personnel accommodations.

OFD owns Station 1, which is a large 50-year-old structure (approximately 13,100 square feet), located at 720 West Second St. The building is in very good condition and provides adequate accommodations for the assigned personnel and equipment, including an ambulance and two personnel operated by Franklin County EMS. The station has four bays, three of which are pass-through and can accommodate upward of nine personnel, along with the administrative offices for the Fire Chief and Assistant Chief. It also has a very spacious and well-equipped training/meeting room. The site also has a number of additional storage areas and significant outside areas for vehicle and trailer storage along with a fire training tower and adjoining open space frequently utilized for fire training evolutions. Due to the age of the structure and the

10. National Fire Protection Association. (2010). NFPA 1710, *Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments*. Boston, MA: National Fire Protection Association.
11. University of Tennessee Municipal Technical Advisory Service, "Clinton Fire Location Station Study," Knoxville, TN, November 2012. p. 8.
12. Ibid, p. 9.

location of the living areas in the basement areas, there are some problems with water seepage, ventilation, and handicapped access.

Station 2 is a 25-year-old, 6,100 square-foot structure that was built in 1998. It is owned by Franklin County. OFD is provided a single pass-through bay for its fire engine and a limited bunk area for the assigned personnel (usually two firefighters). The county operates two of its three full-time ambulances from this facility along with its administrative office for the on-duty EMS supervisor.

The current two-station configuration and their locations are providing excellent response coverage to the existing call activities. The projected response activities within the city are not expected to change significantly with anticipated future growth. However, both facilities are in need of extensive renovations. Station 2 has the most critical needs. This building is too small and needs significant renovations to properly accommodate both city and county resources. The apparatus bay area is too small to properly store the assigned vehicles along with personnel protective equipment, hose, equipment, and supplies. The living and bunkroom areas similarly require renovations and will not be able to house additional personnel if staffing levels are increased. Station 1, though very well maintained and sufficiently sized, is an aging structure and many of its internal components (plumbing, HVAC, roofing, paving and mechanical features) are in need of renovations and/or upgrades.

There were a number of considerations that we evaluated in the station location analysis. These included:

- The optimum positioning of these facilities to provide the shortest response times.
- Positioning that provides an equitable distribution of the call assignments.
- An evaluation of the benefits of co-locating city and county resources.
- Future growth patterns and shifts in service demand and concentrations of call activities.
- The road network and travel restrictions cause by limited river crossing and other access issues.

Coverage Analysis

CPSM used *ArcGIS Online* and *Arc-Pro* to analyze the coverage provided by the current stations and compared this with the coverages that would be possible if other configurations were utilized. GIS data was provided through both city and county portals. Demand analysis was generated by the CPSM data team from call location information obtained from the fire department's incident reporting. We also utilized the *Create Drive-Time Areas Tool* to project response travel speeds; this allowed us to compare the cover rates that can be achieved from different station configurations. This methodology examines historical traffic patterns, adjusted by climatic weather conditions in predicting travel times. We also evaluated any changes in the projected road network that would impact response times.

Coverage was measured as the percent of calls reached in four, six- and eight-minute intervals both as an average and 90th percentile travel times. Again, we looked at the locations of historical call activities to identify the predicted call distribution that would impact station workloads. Travel time was based on the distance from a station to the existing call locations. We examined multiple configurations; options included maintaining an existing station location combined with a new second location. We also plotted scenarios in which the fire department operated from a single fire station location and compared these outcomes with the other scenarios. We identified those scenarios that provided the best coverage and these are presented in Figures 3-5 through 3-8. The following table provides the composite of the configurations and coverages provided in each scenario. In this analysis, Configuration B

provides the best coverage, with 80 percent of the calls reached in 240 seconds, 98 percent reached in 360 seconds, and 99 percent recached in 480 seconds.

TABLE 3-5: Station Location Scenarios

Scenario	Station 1	Station 2	Calls	Coverage
Current	720 West 2nd St.	219 East 14th St.	1,073 @ 240 Seconds 1,918 @ 360 Seconds 1,968 @ 480 Seconds	53.95% 96.43% 98.94%
Configuration **A**	E. Blackhawk St. & N. Poplar St.	219 East 14th St.	1,073 @ 240 Seconds 1,918 @ 360 Seconds 1,968 @ 480 Seconds	53.95% 96.43% 98.95%
Configuration **B**	720 West 2nd St.	S. Princeton St. & W. 23rd St.	1,592 @ 240 Seconds 1,966 @ 360 Seconds 1,983 @ 480 Seconds	80.04% 98.84% 99.70%
Configuration **C**	S. Main St. & W. 7th St.	(None)	1,150 @ 240 Seconds 1,809 @ 360 Seconds 1,962 @ 480 Seconds	57.82% 90.95% 98.94%

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FIGURE 3-5: Current Station Configuration

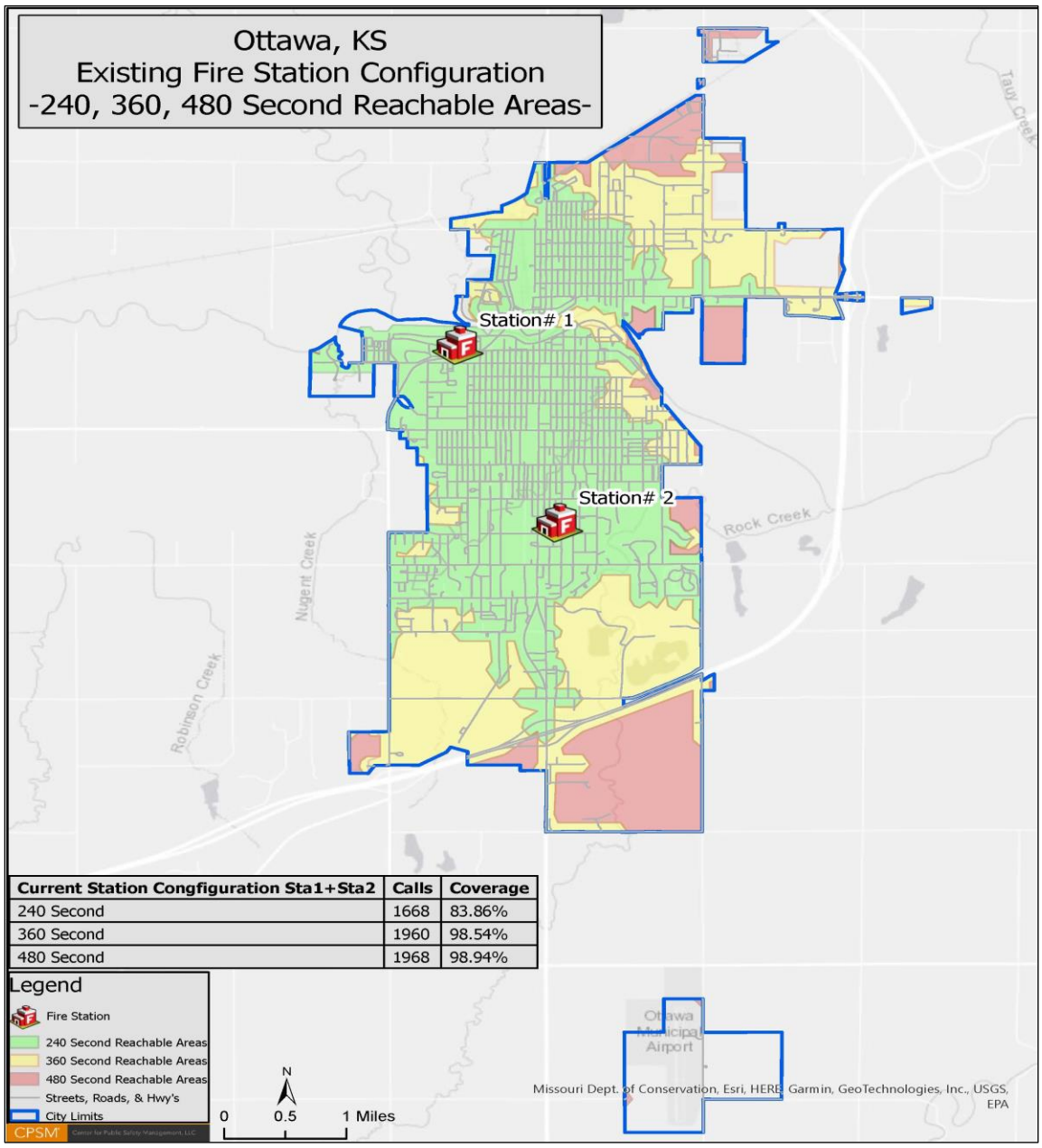


FIGURE 3-6: Configuration A

(Existing Station 1, New Station at E. Blackhawk & N. Poplar)

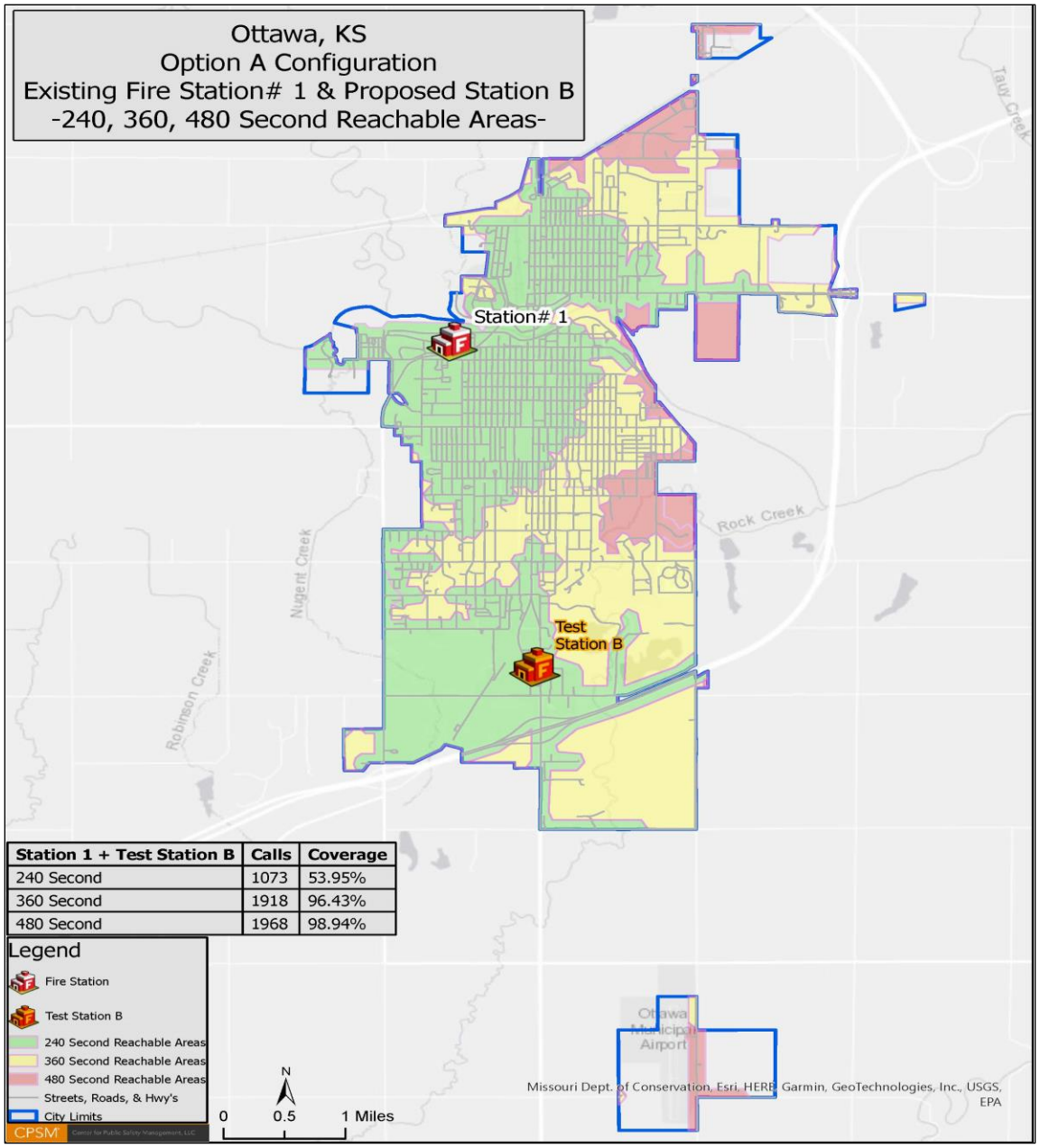
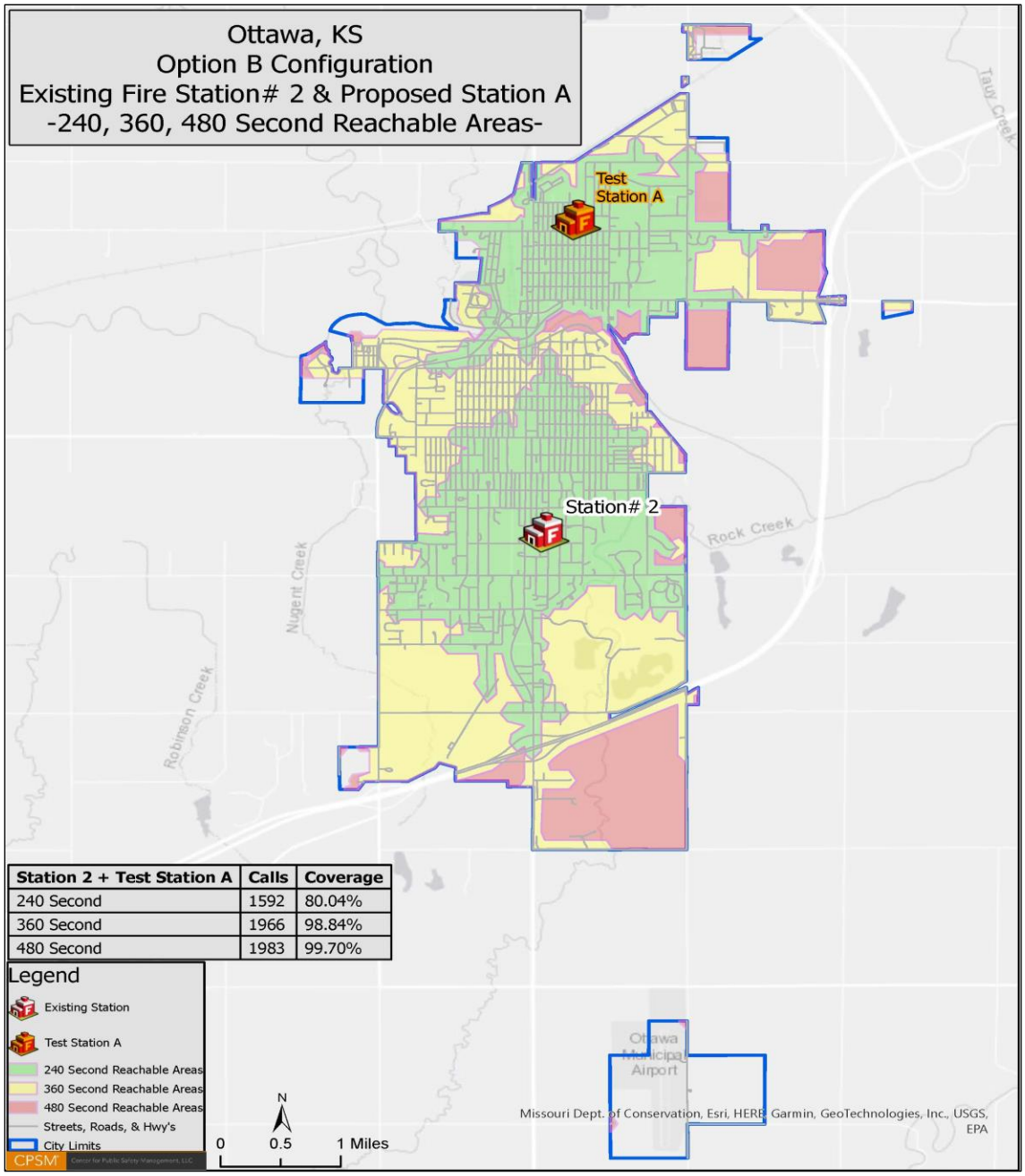


FIGURE 3-7: Configuration B

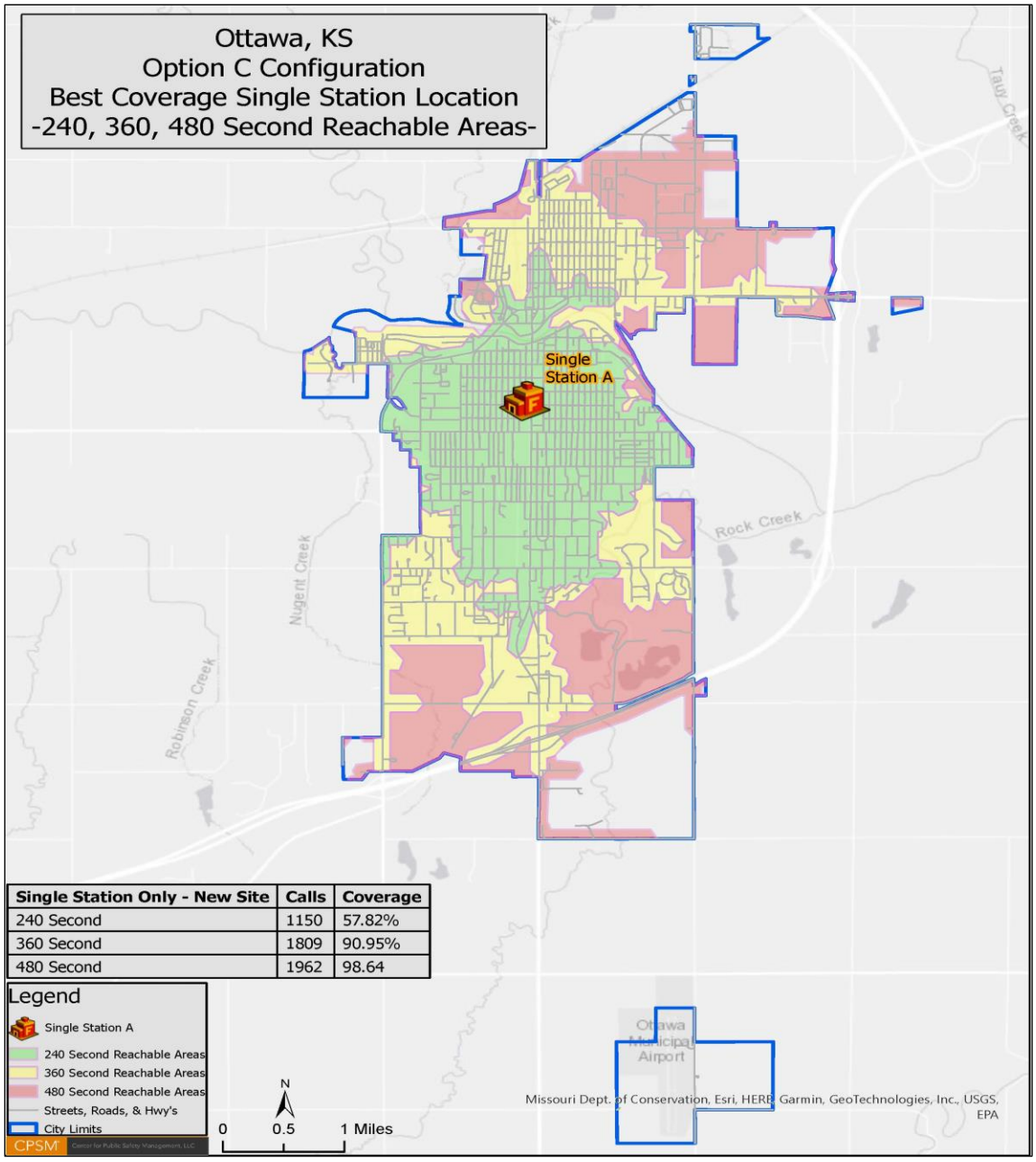
(New Station 1 at Princeton & W. 23rd, Existing Station 2)



Station 2 + Test Station A	Calls	Coverage
240 Second	1592	80.04%
360 Second	1966	98.84%
480 Second	1983	99.70%

FIGURE 3-8: Configuration C, Single Station

(Located at S. Main & W. 7th St.)



Single Station Only - New Site	Calls	Coverage
240 Second	1150	57.82%
360 Second	1809	90.95%
480 Second	1962	98.64

Conclusion

The current fire station locations for both Station 1 and Station 2, along with the co-location of agency resources with the county, are providing exceptional service response and effective coordination between agencies. However, improvements and expansion in the living areas, vehicle storage, and other station work spaces are needed. In addition, a more formal working agreement is needed to delineate the cooperative working arrangement and methodologies to address and resolve conflicts that can occur between the agencies.

Any relocations to the existing two-station configuration would impact overall response times only marginally. Generally speaking, improved coverage can be obtained by relocating Station 1, east and north of its current location. Similarly, overall improvements will be gained if Station 2 was positioned slightly south of its existing location.

A two-station configuration provides the best service coverage to the city. There are multiple iterations of a two-station configuration that can be equally effective.

There is a very viable option for a single-station deployment strategy that can result in effective response times, along with providing the option to continue to co-location arrangements with Franklin County EMS.

A two-station city configuration combined with a separate county EMS station will provide the most improved response coverage; however, this would be the costliest option and the service improvements gained may not justify this approach.

> ***Recommendation: The Ottawa Fire Department should work with Franklin County EMS in developing a feasibility study to expand and improve the station facilities utilized in their co-location arrangement. (Recommendation No. 13.)***

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APPARATUS AND FLEET MANAGEMENT

Fire departments utilize a variety of fire apparatus, along with tools and equipment, in carrying out their core mission. Apparatus generally includes emergency response vehicles such as engines, tenders/tankers (water supply vehicles), aerial apparatus (ladders & quints), rescue vehicles/squads, and ambulances. Some specialized apparatus including wildland engines, off-road vehicles, and watercraft can also be part of the emergency fleet. Trailers are utilized to carry specialized equipment when needed. Other vehicles include hazardous materials response/equipment, decontamination devices and diking materials, structural collapse equipment, portable air filling stations, scene lighting, foam units, and mass casualty incident supplies. In addition, a wide range of utility vehicles including command vehicles and emergency communications units, staff vehicles, and maintenance trucks can be part of the fleet.

The mission, duties, demographics, geography, and construction features within the community all play a major role in the makeup of the apparatus and equipment inventory utilized. These factors, as well as the funding available, must be taken into consideration when specifying and purchasing apparatus and equipment. Every effort should be made to make new apparatus as versatile, safe, and multifunctional as is possible as well as practical.

Apparatus maintenance is also an integral part of any fire department, and budget-wise it is invariably a key component in keeping such expensive vehicles in top shape to extend their usefulness. It takes a big chunk of a city's budget to purchase and subsequently maintain a fire department fleet. As fleets age, it is logical and sound planning to conclude that repairs and costs will increase exponentially.

There are two proven ways to mitigate the long-term and short-term costs associated with repairs and replacements. The primary way is to have a sound, dedicated preventive maintenance (PM) program that is on a regular cycle for each and every vehicle in a department's fleet. PM should be a sacrosanct practice that is unwavering. This strategy not only saves money, but can very well save lives. The other component is to have a realistic capital improvement plan (CIP) to acquire new apparatus when an existing vehicle has outlived its usefulness. NFPA 1911, which sets standards for *Guidelines for First-Line and Reserve Fire Apparatus*, has changed and adapted over the years to reflect the changes in industry standards, but on one thing it has been wholly consistent:

> *"…it is imperative that all fire apparatus be checked and maintained regularly to ensure that they are reliable and safe to use. The manufacturer's instructions should always be followed when maintaining the fire apparatus."*

The standard further states:

> *"In the fire service there are fire apparatus with 8 to 10 years of service that are simply worn out. There is also fire apparatus that were manufactured with quality components, that have had excellent maintenance, and that have responded to a minimum number of incidents that are still in serviceable condition after 20 years. …the quality and timelessness of maintenance are perhaps the most significant factors in determining how well a fire apparatus ages.*

NFPA Standard 1915 addresses the minimum expectations for a comprehensive PM program. The benefits of implementing a PM program in compliance with NFPA 1915 are many. First, maintaining a vehicle is less expensive than repairing it. Second, vehicles that undergo PM on a dedicated schedule are more likely to have a longer lifespan. Third, PM reduces the time that a

vehicle is unavailable for use in the community by reducing the chances that it will need repairs that take it out of service for a lengthy period of time. Finally, demonstrating adherence to an NFPA 1915-compliant PM program reduces the chance of a maintenance-related untoward event and possible resulting lawsuits.

The OFD deploys two primary first response units to accomplish its mission. At the time of our site visit, a new fire engine had been delivered and was being readied for being placed into service as a replacement for Engine 2. Most of the fire apparatus, support vehicles, and specialty trailers are housed at Station 1 because of the limited space available at Station 2.

The department maintains several reserve apparatus (engines, ladders, and utility units) for use when maintenance or repair is needed for its frontline apparatus. Altogether, the department's entire fleet is comprised of 14 units including apparatus reserve units, trailers, staff vehicles, etc. In addition, the department has three aerial drones that are used for surveillance and the transport of light equipment. The following table shows the basic frontline inventory.

TABLE 3-6: OFD Inventory of Frontline Apparatus

Unit	Type	Make	Year	Age	Mileage*
Engine 1	Type 1 Engine	Pierce Enforcer	2017	7 years	30,868
Engine 2	Type 1 Engine	Pierce Enforcer	2022	new	N/A
Engine 3	Type 1 Engine	Pierce Enforcer	2001	23 years	69,626
Tower 1	Ladder Truck	Pierce Aerial	2008	16 years	17,476
Brush 1	Brush Truck	Ford-V-8	2007	16 years	61,474
Squad 1	Rescue Unit	Pierce	2007	16 years	22,300
Boat 1	Outboard V-Hull	Crestliner	2015	9 years	N/A
Air 1	Air & Light Unit	Kaufman	2021	3 years	N/A
Eagle 1	Drone	DJI	2022	2 years	N/A
Eagle 2	Drone	DJI	N/A	12 years	N/A
Eagle 3	Drone	DJI	N/A	7 years	N/A
Utility 2	Pick-up	Chevrolet	2009	14 years	N/A

Note: *Mileage as of Feb. 2020.

The department's two frontline pumpers range in age from 1 year to 7 years. The department's ladder truck, which is used primarily as a back-up unit for the primary response engines, is 16 years old but has an odometer reading of fewer than 25,000 miles. The reserve apparatus in the fleet are generally sufficient to serve in a replacement mode. The fleet is well-maintained and the department has been proficient in its replacement schedule.

The city's Fleet Management Division is responsible for maintaining the department's fire apparatus, support vehicles, tools, and equipment along with the city's combined 182-vehicle fleet. These services are supervised by the Maintenance Director who supervises the City Garage, which is located at 322 South Beach St. The City Garage is well-equipped, sufficiently sized, clean, and well-maintained. The Maintenance Director oversees the garage and the entire fleet maintenance system. This workload is significant and the capacity of this staff in meeting the entire needs of the city is being stretched. CPSM highly commends the efficiency and effectiveness of the fleet management services unit, given its limited staff and the corresponding output of services delivered.

That said, we found the Fleet Management Division does not fully utilize an automated work-order tracking system. It was difficult to determine the length of time it takes to service a particular unit or the actions taken or found in a particular repair. CPSM believes that the Fleet Management Division should institute a comprehensive work-order tracking system.

> ***Recommendation: The city's Fleet Management Division should institute a work-order tracking system that is fully automated and provides comprehensive records on all work done to vehicles, along with repair status and the associated costs. (Recommendation No. 13.)***

Preventive maintenance is performed at regular intervals on all response vehicles. The Fleet Management Division will do just about all repairs in-house. Fleet management personnel are not involved in writing and reviewing vehicle specifications and working with OFD operational personnel on vehicle acceptance.

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NFPA 1901, *Standard for Automotive Fire Apparatus*, 2016 edition, serves as a guide to the manufacturers that build fire apparatus and the fire departments that purchase them. The document is updated every five years, using input from the public/stakeholders through a formal review process. The committee membership is made up of representatives from the fire service, manufacturers, consultants, and special interest groups. The committee monitors various issues and problems that occur with fire apparatus and attempts to develop standards that address those issues. Of primary interest to the committee over the past years has been improving firefighter safety and reducing fire apparatus accidents.

The Annex Material in NFPA 1901 contains recommendations and work sheets to assist in decision-making in vehicle purchasing. With respect to recommended vehicle service life, the following excerpt is noteworthy:

> *"It is recommended that apparatus greater than 15 years old that have been properly maintained and that are still in serviceable condition be placed in reserve status and upgraded in accordance with NFPA 1912, Standard for Fire Apparatus Refurbishing, to incorporate as many features as possible of the current fire apparatus standard. This will ensure that, while the apparatus might not totally comply with the current edition of the automotive fire apparatus standards, many improvements and upgrades required by the recent versions of the standards are available to the firefighters who use the apparatus."*[13]
>
> *"Apparatus that were not manufactured to the applicable apparatus standards or that are over 25 years old should be replaced."*[14]

In a 2004 survey of 360 fire departments in urban, suburban, and rural settings across the nation, Pierce Manufacturing reported on the average life expectancy for fire pumpers.[15] The results are shown in the following table.

13. NFPA 1901, *Standard for Automotive Fire Apparatus*, 2016 Edition. Quincy, MA.
14. NFPA 1901, *Standard for Automotive Fire Apparatus*, 2016 Edition. Quincy, MA.
15. "Fire Apparatus Duty Cycle White Paper," Fire Apparatus Manufacturer's Association. August 2004.

TABLE 3-7: Fire Pumper Life Expectancy by Type of Jurisdiction

Demographic	Frontline Service	Annual Miles Driven	Reserve Status	Total Years of Service
Urban	15 Years	7,629	10 Years	25
Suburban	16 Years	4,992	11 Years	27
Rural	18 years	3,034	14 Years	32

Note: Survey information was developed by Added Value Inc. for Pierce Manufacturing in, "Fire Apparatus Duty Cycle White Paper," Fire Apparatus Manufacturer's Association (FAMA), August 2004.

Most agencies utilize a combination of funding methods for apparatus replacements. These include capital replacement funds, bond initiatives, or simply through annual budget allocations. The key, however, is to develop an ongoing funding mechanism to fund the replacement of apparatus when their useful lifespan has been met. Ottawa does not utilize a fire apparatus fleet replacement fund. In discussion with Ottawa financial staff, we found most fire apparatus are acquired though a commercial leasing process. The city recently acquired a new pumper to replace Engine 2, which is 23 years old.

Using a straight-line amortization schedule that anticipates a 15-year replacement schedule for engines and brush truck and 20 years for ladders, CPSM estimates that a vehicle replacement fund will require $295,000 annually to keep pace with the replacement schedule and to add additional funds for existing apparatus that have not had funds for their replacement contributed to date. This schedule assumes a replacement cost of $860,000 for an engine, $1.3 million for a ladder truck, and $350,000 for a brush truck. Also note that no adjustment was made in this calculation for the annual cost increase in new fire apparatus, which historically has averaged 3 percent to 5 percent annually.

> ***Recommendation: The city should institute a fire apparatus replacement fund that provides annual contributions towards the replacement of this equipment on the basis of its expected service life. (Recommendation No. 14.)***

The current condition of the fire fleet is very good and the number of large apparatus in the fleet are limited. CPSM believes that by establishing a replacement fund for future purchases the city can reduce its financing costs and also avoid untimely major expenses when fire apparatus begins to fail.

Capital Equipment

Fire apparatus are equipped with various types of tools and equipment that are utilized in providing fire and EMS services. Many of the tools and much of the equipment carried on fire apparatus are specified in NFPA and ISO guidelines. Fire and EMS equipment includes such items as hose, couplings, nozzles, various types of ladders, foam, scene lighting, oxygen tanks, AEDs, defibrillators, small hand tools, fire extinguishers, mobile and portable radios, salvage covers, and medical equipment and supplies. Many of the small tools and equipment are considered disposable items and are replaced with ongoing operating funds. However, some pieces of equipment are very expensive, and thus their replacement must be planned. The more expensive capital items include:

- Self-contained breathing apparatus (SCBA) and fill stations.
- Firefighting PPE (personal protective equipment).
- Hydraulic/pneumatic extrication equipment.

- Portable generators
- ECG monitors/defibrillators/AEDs.
- Thermal imaging cameras.
- Mobile/portable and base radios.
- Aerial drones
- Mobile data computers.
- Gas monitoring and detection devices.

Much of the more expensive capital equipment is generally on a ten-year replacement cycle. Each new apparatus must be outfitted with a complement of capital equipment; a full complement has an estimated cost of nearly $300,000. The total cost of outfitting a department the size of the OFD with the capital items described is estimated to be approximately $1 million. City staff has been successful in obtaining various grant awards that provide one-time funding for this equipment. Thus, CPSM estimates that the annual replacement needs for these types of capital items in the OFD is approximately $75,000 to $100,000.

RADIO INTEROPERABILITY AND COVERAGE

In general, interoperability refers to seamless radio communications between emergency responders using different communication systems or products. Wireless communication interoperability is the specific ability of emergency responders to use voice and data communication in real time, without delay. For example, police, fire, and EMS responding to an incident are interoperable when all can communicate with one another over individual and perhaps shared communication channels. Interoperability enables first responders from any jurisdiction to communicate with one another at larger incidents and also enables emergency planners and personnel to coordinate their radio operations in advance of major events.[16]

The OFD has transitioned its radio system to a P-25, trunked system. This system provides complete interoperability with area law enforcement, Franklin EMS, and surrounding jurisdictions. The radio communications system currently utilized by Ottawa is very reliable and provides excellent coverage throughout the service area. CPSM recognizes Ottawa's efforts in developing a fully integrated radio communications system as a ***Best Practice***.

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16. SAFECOM, U.S. Department of Homeland Security, "Interoperability," http://www.safecomprogram.gov/SAFECOM/interoperability/default.htm.

SECTION 4. ANALYSIS OF PLANNING APPROACHES

FIRE RISK ANALYSIS

The cost of providing fire and EMS protection in many communities has increased steadily in recent years. This has been fueled in part by rising wages, additional special pay, and escalating overtime costs. In addition, funding requirements have been compounded by increasing health insurance premiums and spiraling pension contributions. In Ottawa as in many communities across the nation, the combined costs for employee benefits are approaching 75 percent to 80 percent of the base salary costs. At the same time, the workforce has become less productive, largely because of the increases in lost time, specifically vacation leave, greater usage of sick leave, holiday leave, compensatory time, and increases in other miscellaneous lost time categories (Kelly Days, workers' compensation, light duty, FMLA, training leave, etc.). As a result, many jurisdictions are asking the fundamental question of whether the level of risk in their jurisdiction is commensurate with the type of protective force that is being deployed. To this end, a fire risk and hazard analysis can be helpful in providing a more objective assessment of a community's level of risk.

A fire risk analysis utilizes a "fire risk score," which is a rating of an individual property on the basis of several factors, including:

- Needed fire flow if a fire were to occur.
- Probability of an occurrence based on historical events.
- The consequence of an incident in that occupancy (to both occupants and responders).
- The cumulative effect of these occupancies and their concentration in the community.

A community risk and vulnerability assessment is used to evaluate community properties and assign an associated risk as either a high, medium, or low hazard. The NFPA *Fire Protection Handbook* defines these hazards as:

> **High-hazard occupancies:** Schools, hospitals, nursing homes, explosives plants, refineries, high-rise buildings, and other high life-hazard or large fire-potential occupancies.
>
> **Medium-hazard occupancies:** Apartments, offices, and mercantile and industrial occupancies not normally requiring extensive rescue by firefighting forces.
>
> **Low-hazard occupancies:** One-, two-, or three-family dwellings and scattered small business and industrial occupancies. [17]

Plotting the rated properties on a map provides a better understanding of how the response matrix and staffing patterns can be used to ensure a higher concentration of resources for worst-case scenarios or, conversely, fewer resources for lower levels of risk.[18]

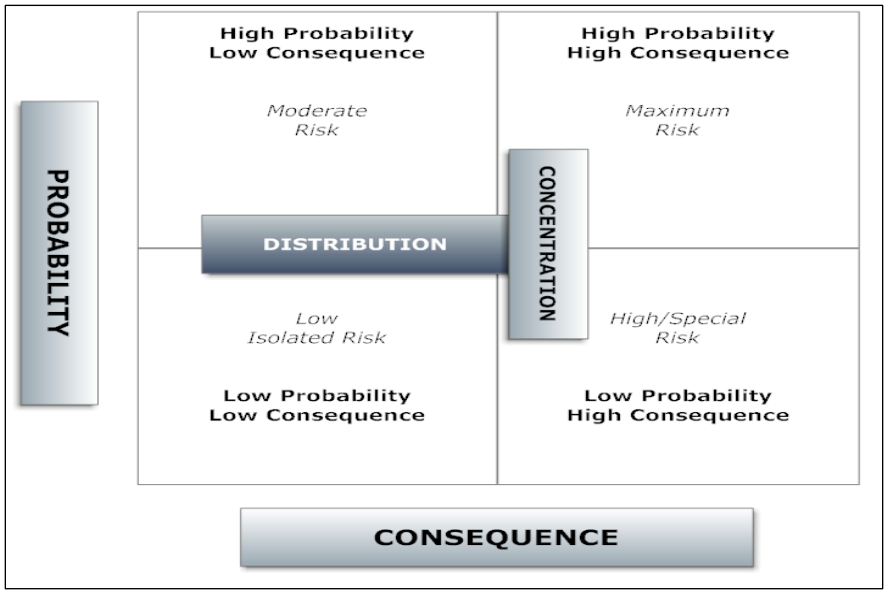
17. Cote, Grant, Hall & Solomon, eds., *Fire Protection Handbook* (Quincy, MA: NFPA 2008), 12.
18. *Fire and Emergency Service Self-Assessment Manual*, Eighth Edition (Center for Public Safety Excellence, 2009), 49.

Hazard Analysis and Community Risk Assessment

Hazard analysis and community risk assessment are essential elements in a fire department's planning process. The City of Ottawa and the OFD have recognized the need for a comprehensive community risk and vulnerability assessment and are working diligently in pursuing this outcome to help define the optimum arrangement for deploying resources. Each jurisdiction has to decide what degree of risk is acceptable to the citizens it serves. This determination is based on criteria that have been developed to define the levels of risk (e.g., of fire) within all sections of the community.[19] To this end, a comprehensive planning approach that includes a fire risk assessment and hazard analysis is essential in determining local needs.

The term *integrated risk management* refers to a planning methodology that recognizes that citizen safety, the protection of property, and the protection of the environment from fire and related causes must include provisions for the reasonable safety of emergency responders. This means assessing the risk faced, taking preventive action, and deploying the proper resources in the right place at the right time.[20] There are two main considerations of a risk assessment: the probability of an event occurring and the consequence of that event occurring. The matrix in the following figure divides the risk assessment into four quadrants. Each quadrant of the chart creates different requirements in the community for commitment of resources.

FIGURE 4-1: Community Risk Matrix



Plotting the rated properties on a map will provide a better understanding of how the response matrix and staffing patterns can be used to ensure a higher concentration of resources for worst-case scenarios or, conversely, fewer resources for lower levels of risk.[21]

Community risk and vulnerability assessments are essential elements in a fire department's planning process. Although the City of Ottawa and the OFD have identified a number of

19. Compton and Granito, *Managing Fire and Rescue Services*, 39.
20. Cote, Grant, Hall & Solomon, eds., *Fire Protection Handbook* (Quincy, MA: NFPA 2008), 12-3.
21. *Fire and Emergency Service Self-Assessment Manual*, Eighth Edition, (Center for Public Safety Excellence, 2009), 49.

potential hazards in the community, a comprehensive community risk and vulnerability assessment has not been done.

> ***Recommendation: The Ottawa Fire Department should conduct a formal fire risk assessment that concentrates on the city's downtown, strip commercial establishments, big-box occupancies, high-rise structures, and industrial, processing, and institutional properties. (Recommendation No. 15.)***

As a guide in conducting a vulnerability assessment, CPSM has developed the following template that may be utilized in completing this process.

Community Risk Assessment Template

TASK 1: Establish a Risk Assessment Team

- Five to six members with assorted skills.
- Team leader.
- Data analyst.
- Tactical/command expertise.
- City planning/growth management.
- Financial/economic.
- GIS/mapping.

TASK 2: Review and Plot Historical Workload (5 years)

- Break out daily call distribution by type.
  - Location/occupancy type.
  - High-volume/frequent use.
    - Hospital.
    - University.
    - Adult living center.
- Identify high-dollar loss fire events (>$25K).
  - Location/occupancy type.
  - Cause & origin/demographic.
- Identify high-manpower events (>20 people).
- Identify high-time duration events (>2 hours).
- Identify events with significant economic impact (>$1 million).
- Identify events with multiple injuries or fatalities.
- Identify events with significant environmental impacts (which require remediation).

TASK 3: Identify the Community Risks for High-profile Events

- Transportation accidents (rail, air, roadway, port).

- Occupancies with high OVAP scores.[22]
- Wildfire events.
- Large, complex fire (dormitory, assisted living, jail, hospital, etc.).
- Processing or manufacturing accident (chemical, radiologic, petroleum, electrical, etc.).
- Mass casualty incident.
- Weather, flooding, or seismic event.
- Terrorist event.
- Driven by a community profile or demographic.

TASK 4: Identify Capacity Issues or Incidents in which Insufficient Resources Resulted in a Negative Outcome

- Related to daily activities.
- Related to larger/significant events.
- Related to incidents requiring the utilization of mutual aid or external resources.
- Other incident types.

TASK 5: Identify Additional Service Demands Related to Anticipated Growth of the Service Area

- Affecting daily activities
- Related to larger/significant events
- Incidents that require specialized services or a currently unavailable expertise

TASK 6: Identify Risk Reduction or Prevention Efforts that can Reduce or Eliminate Future Workload

- Related to daily activities.
- Related to larger/significant events.
- Related to new demand resulting from growth.
- Develop cost/outcome analysis.

TASK 7: Identify Additional Training Needs to Better Manage Current or Anticipated Service Demand

- Develop cost/outcome analysis.

TASK 8: Identify Organizational or Tactical Capabilities Needed to Meet Current Shortfalls

- Develop cost/outcome analysis.

In addition to examining risks faced by the community at large, the department needs to examine internal risks. The National Fire Protection Association's *Standard for a Fire Department Occupational Safety and Health Program* (NFPA 1500) requires a risk management plan for fire departments to be developed separately from those that are incorporated in the local

22. http://riskassessment.strategicfire.org/wp-content/uploads/2016/03/Community-Risk-Assessment-Guide-v1.5.pdf

government plan.[23] The Ottawa Fire Department does not have a written internal risk management program in place.

A fire department risk management plan is developed and implemented to comply with the requirements of NFPA 1500. The following components must be included in the risk management plan:

Risk Identification: Actual or potential hazards.

Risk Evaluation: The potential of occurrence of a given hazard and the severity of its consequences.

Prioritizing Risk: The degree of a hazard based upon the frequency and severity of occurrence.

Risk Control: Solutions for elimination or reduction of real or potential hazards by implementing an effective control measure.

Risk Monitoring: Evaluation of effectiveness of risk control measures. [24]

HAZARDOUS MATERIALS RESPONSE

Hazardous materials incidents occur with some frequency in Ottawa. In 2022, according to data provided by the OFD, there were 18 hazmat-related calls of varying degree. Incidents ranged from natural gas and propane leaks, carbon monoxide incidents, biologic hazards, combustible and flammable gas spills, chemical hazards, assorted spills and leaks, and chemical incidents. A portion of the incidents are directly attributable to gasoline and oil spills from vehicles that travel through portions of Ottawa. Interstate 35 and Kansas Highway 68 run through or are adjacent to the city and account for much of the city traffic and a portion of the spill calls.

the Ottawa Municipal Airport is a general aviation airport facility located one mile south of the city's new Proximity Industrial Park. The airport is owned by the city but operated by a Fixed Base Operator. The 4,500-foot runway serves primarily private jets and freight delivery. OFD will respond from off-site locations during any aircraft emergency at the airport. The airport is poised for expanded operations due to its proximity to the new industrial park.

Indeed, the traditional primary risks are those generated by hazmat transportation and fixed facilities. However, over the years, the type and nature of incidents to which regional hazmat teams may respond has significantly changed and have become more technically challenging. Examples include the following:

- Clandestine labs, criminal and terrorist use of hazmat as weapons, chemical suicides, etc.
- Interdisciplinary response scenarios in which the regional hazmat teams interface with their response partners in the law enforcement, emergency medical, and fire communities. Scenarios include special events and the use of Joint Hazard Assessment Teams (JHAT), improvised explosive devices, coordinated/complex attack scenarios, active shooter/assailant scenarios, and the emergence of virus threats such as Ebola and Zika.

23. Robert C. Barr and John M. Eversole, eds., *The Fire Chief's Handbook*, 6th edition (PennWell Books, 2003), 270.
24. NFPA 1500, *Standard for a Fire Department Occupational Safety and Health Program* (2007 ed.), Annex D.

- Tourism and economic development initiatives have drawn national level and sporting events and festivals to the state. While this is a positive economic development, high-profile and high-density crowd events raise the threat level that requires a more sophisticated hazmat preparedness and response package.
- Changes in the U.S. domestic energy infrastructure have impacted the response community, such as for incidents involving high-hazard, flammable trains with crude oil and ethanol, increased use of liquefied natural gas (LNG) and related facilities, etc.
- The increasing use of social media is viewed as both a situational awareness asset and a potential operations security (OPSEC) vulnerability. The regional hazmat teams can assume a leadership role in determining future pathways and options on how social media can be safely and effectively integrated into response operations.[25]

Level I hazardous materials incidents are typically managed and mitigated by the first response personnel without a hazardous materials response team or other special unit. These incidents include:

- Spills that can be properly and effectively contained/or abated by equipment and supplies immediately accessible to OFD.
- Leaks and ruptures that can be controlled using equipment and supplies accessible to OFD.
- Fires involving toxic materials and which can be extinguished and cleaned up with resources immediately available to OFD.
- Hazardous materials incidents not requiring civilian evacuation. (Example: A small pool supply spill that can be diluted with water for clean-up.)

In the event of a larger incident (Level II and III), in which a regional hazardous material team is required, Ottawa will request assistance from either the Kansas State Fire Marshal's Office, Lawrence/Douglas County, Kansas City, Wichita or Olathe. Each OFD responder maintains hazardous materials operations-level certification, which enables them to identify hazards and conduct defensive operations for those situations requiring Level II and III capability.

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25. Flippin, P., et al; Virginia Department of Emergency Management Hazmat Program Strategic Review (VDEM, Richmond, VA, 2016)

TARGET HAZARDS AND FIRE PREPLANNING

The process of identifying target hazards and pre-incident planning are basic preparedness efforts that have been key functions in the fire service for many years. In this process, critical structures are identified based on the risk they pose. Then, tactical considerations are established for fires or other emergencies in these structures. Consideration is given to the activities that take place (manufacturing, processing, etc.), the number and types of occupants (elderly, youth, handicapped, imprisoned, etc.), and other specific aspects relating to the construction of the facility or any hazardous or flammable materials that are regularly found in the building. Target hazards are those occupancies or structures that are unusually dangerous when considering the potential for loss of life or the potential for property damage. Typically, these occupancies include hospitals, nursing homes, and high-rise and other large structures. Also included are arenas and stadiums, industrial and manufacturing plants, and other buildings or large complexes.

NFPA's 1620, *Standard for Pre-Incident Planning,* through its *Sample Pre-Incident Plan Field Collection Card and Facility Data Record* in Annex A is quite specific in identifying the need to utilize a written narrative, diagrams, and predesignated, detailed forms to depict the physical features of a building, its contents, and any built-in fire protection systems. Information collected for pre-fire/incident plans includes, but is certainly not limited to, data such as:

- The occupancy types.
- Floor plans/layouts.
- Building construction type and features.
- Building fire protection systems.
- Utility locations.
- Hydrant locations.
- Hazards to firefighters and/or firefighting operations.
- Hazmat considerations and locations.
- Special conditions in the building.
- Apparatus placement plan.
- Fire flow requirements and/or water supply plan.
- Forcible entry and ventilation plan.
- Emergency contact information.

NFPA 1620 goes on to state that "A pre-incident plan is one of the most valuable tools available for aiding responding personnel in effectively controlling an emergency."[26] The information contained in pre-incident fire plans enables firefighters and officers to have a familiarity with the building/facility, its features, characteristics, operations, and hazards. Thus, they can more effectively, efficiently, and safely conduct firefighting and other emergency operations. Pre-

26. http://www.nfpa.org/codes-and-standards/all-codes-and-standards/codes-and-standards/detail?code=1620

incident fire plans should be reviewed regularly and tested by periodic table-top exercises and on-site drills, especially in the most critical and frequented occupancies.

Strategically and from an operational standpoint, according to NFPA 1620, pre-incident planning is a total concept based upon the following:

- Situation awareness.
- Management commitment.
- Education.
- Protection.
- Prevention.
- Emergency organization.[27]

Ottawa is home to Advent Health-Ottawa, formally Ransom Memorial Health and the Health Partnership Clinic. There are a number of assisted living facilities in Ottawa including Vitage Park, Ottawa Retirement Village, Rock Creek, Morningstar Care Homes, Cedar Care Senior Housing, and Park Place.

There are a number of manufacturing and processing establishment in Ottawa including; Monoflo International, Green Dot Bioplastics, Kalmar USA, and Agri Industries. The downtown area also has a number of businesses and restaurants with suppression systems for which familiarization and preplanning walk-throughs could be accomplished during the company inspection program.

OFD line personnel are actively involved in in-service company inspections and pre-fire incident planning. More than 600 properties are inspected on a regular basis, including an adult detention facility, dormitories, airport properties and hangers, day care centers, hotel/motels, and a number of other storage, mercantile, and multifamily residential properties. CPSM believes that these efforts are critical in developing tactical expertise and preplanning reconnaissance; while at the same time they provide an ability to inspect and correct code violation and life-safety concerns. CPSM recognizes OFD and its pre-fire planning and in-service company inspection program as a ***Best Practice.***

ACCREDITATION

Accreditation is a comprehensive self-assessment and evaluation model that enables organizations to examine past, current, and future service levels. It is used to evaluate internal performance and compares this performance to industry best practices. The intent of the process is to improve service delivery.

The Center for Public Safety Excellence (CPSE) provides an extensive evaluation process, on a fee basis, to member agencies and which ultimately leads to accreditation. CPSE is governed by the Commission on Fire Accreditation International (CFAI), an 11-member commission representing a cross-section of the fire service, including fire departments, city and county management, code councils, the U.S. Department of Defense, and the International Association of Firefighters.

27. Ibid.

The CPSE Accreditation Program is built around the following key measurements:

- Determine community risk and safety needs.
- Evaluate the performance of the department.
- Establish a method for achieving continuous organizational improvement.

Local government executives face increasing pressure to "do more with less" and justify expenditures by demonstrating a direct link to improved or measured service outcomes. Particularly for emergency services, local officials need criteria to assess professional performance and efficiency.

CPSE accreditation has national recognition and is widely used throughout the fire service. The key to its success is that it enables communities to set their own standards that are reflective of their needs and a service delivery model that is specific to these needs. In addition, it is a program that is based on ongoing improvement and continuous monitoring. The CPSE accreditation model may be well-suited for Ottawa.

The pursuit of CPSE Fire Accreditation will be a significant undertaking that requires significant staff hours in developing the various reporting and analysis. This will be a department-wide commitment, both in developing the initial analysis and for the on-going reporting that will be required.

Recommendation: Ottawa should consider working toward CPSE Fire Accreditation in the future. (Recommendation No. 16.)

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SECTION 5. OPERATIONAL RESPONSE APPROACHES

As mentioned previously, many agencies incorporate the use of pre-fire plans to provide a response and tactical strategy for those more critical or complex occupancies in the community. Figures 5-1 to 5-3 illustrate the critical tasks and resources required on low- and moderate-risk structure incidents along with when an aerial device is utilized. Understanding the community's risk greatly assists fire department planning, and with ongoing training, these activities improve overall effectiveness and responder safety.

FIGURE 5-1: Low-Risk Response, Exterior Fire Attack

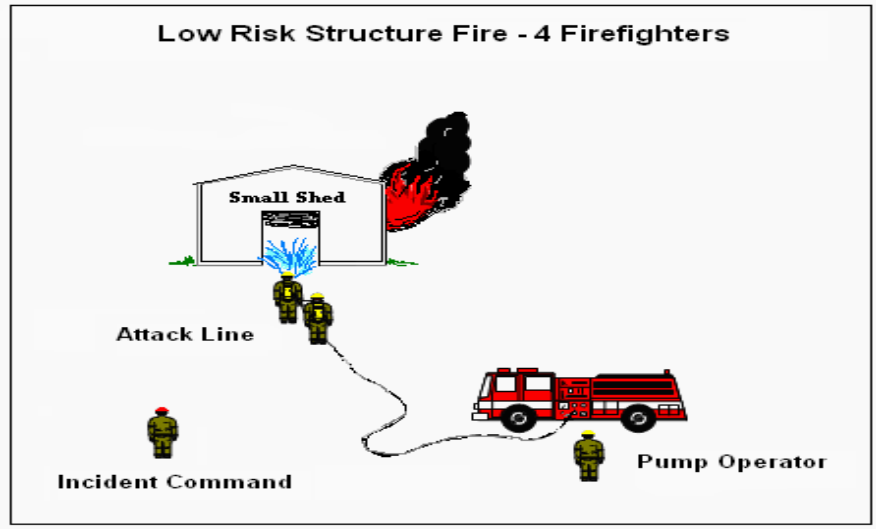

Figure 5-2 is a representation of the critical task elements for a moderate-risk structure fire. Some jurisdictions add additional response resources to meet and, in some cases, exceed the national benchmarking provided by the National Fire Protection Association (NFPA) 1710, *Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Departments*, 2020 Edition. NFPA 1710 calls for the initial assignment of 16 personnel on a single-family residential structure fire when an aerial ladder is not utilized. Ottawa is unable to assemble this full complement of resources for a single-family residential structure fire from its on-duty resources. Additional resources are typically obtained from the re-call of off-duty personnel and through mutual aid requests from neighboring volunteer fire companies

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FIGURE 5-2: Moderate-Risk Response, Interior Fire Attack

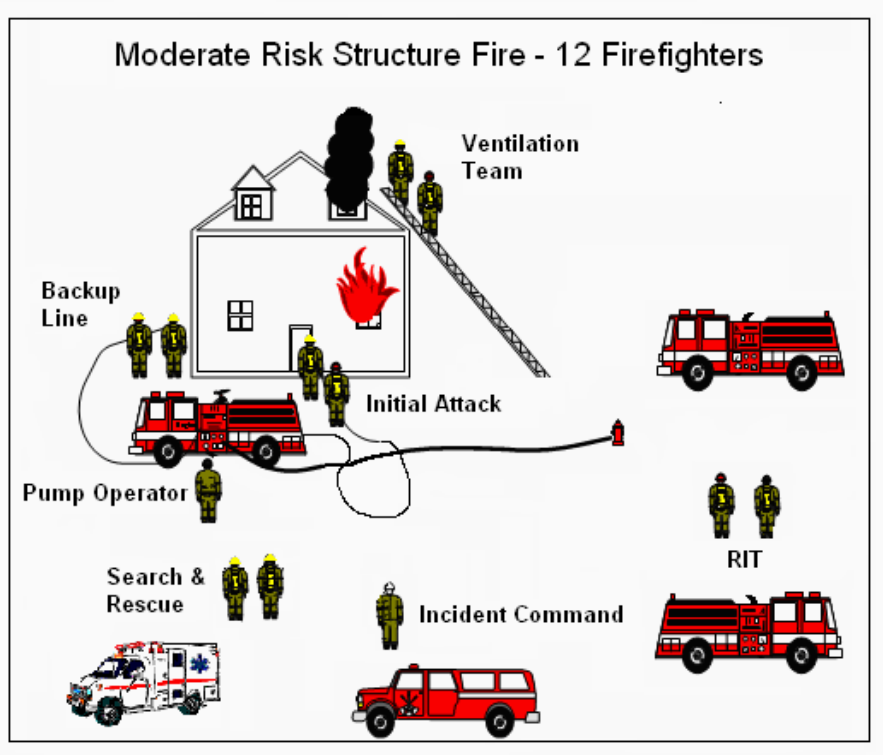
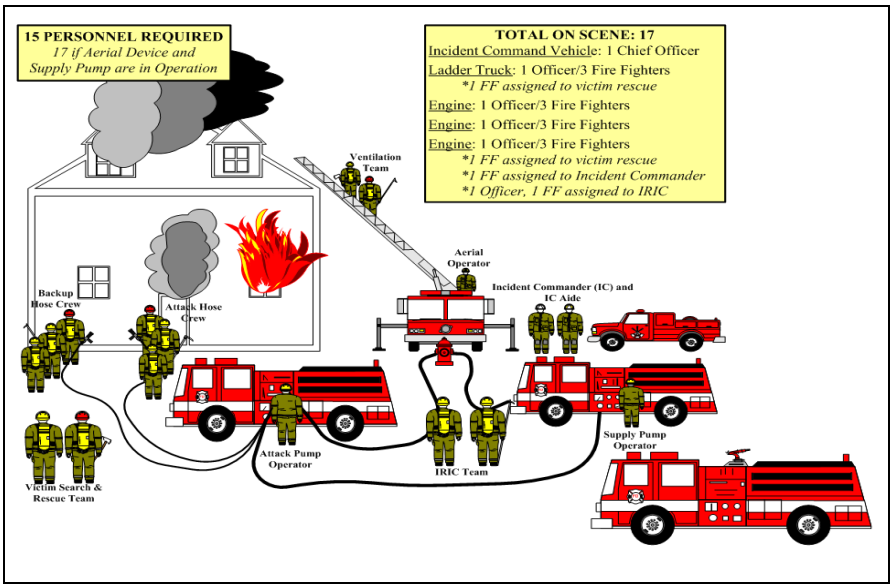


FIGURE 5-3: Full-Force Response when Utilizing an Aerial Device



The ability to assemble the necessary resources to effectively manage even a smaller residential or commercial structure fire is significant. As mentioned above, the NFPA 1710 standard recommends a minimum of 16 personnel as the initial response to a fire at a single-family residential structure. An actual fire of any significance will require 16 to 20 personnel or more for extended periods of time. As the incident grows in size and complexity, it is not unusual to see staffing needs that can exceed 30 to 40 personnel. This would be the case in a fire at a big-box retail center like a Home Depot or Walmart, a wildfire, or a fire at an apartment complex. Though these larger incidents do not occur frequently, when they do occur, the ability to assemble sufficient resources rapidly can significantly impact the outcome.

The decision as to what is the proper staffing level for a specific community's protection is perhaps the most difficult assessment faced by policy makers and fire department leadership across the nation. As communities adjust this level of response, the costs associated with maintaining this level of readiness will have significant financial implications. CPSM believes that the current deployment process in Ottawa is minimal, at best, in providing sufficient structural fire protection. The addition of one full-time person to the daily minimum staffing complement, as recommended in this study, will assist in improving the safety aspects of operating in a hazardous environment, but this increase will continue to fall short in providing the needed complement of personnel that is recommended for the extinguishment of a simple residential structure fire. The Ottawa Fire Department is the only full-time career fire department in all of Franklin County. Though the agency is extremely proficient and well trained in providing fire suppression and EMS first response services, its capacity in managing larger events is extremely limited. The reliance on the re-call of off-duty personnel and volunteer forces is the best option currently available, but as the city grows and there is increasing service demand, an expansion of the overall response capabilities must be addressed.

> ***Recommendation: Ottawa should consider the creation of a cadre of Reserve Fire and EMS personnel to supplement staffing levels for, structure fires, larger events, and disaster situations. (Recommendation No. 17.)***

The city employs more than 165 full-time personnel; in addition, there are a number of additional part-time employees throughout city government. These personnel provide an ideal pool of perspective candidates who may be recruited and trained to serve as ***"Reserve Fire and EMS Personnel."*** These individuals would then be available to supplement firefighting personnel during periods of disaster or large-scale events. Reserve employees can receive additional pay, training, and personal protective equipment and would be on-call for response during larger emergencies. These supplemental responsibilities can be crafted so as to minimize any impacts on their normally assigned duties. CPSM believes that a core number of Reserves, estimated at 10 to 15 individuals, can provide a viable pool of individuals who can expand the ranks of emergency workers who can be called upon to supplement full-time fire personnel during periods of elevated service demand.

Volunteer Firefighter Services

Though OFD maintains an active corps of volunteer firefighters to supplement on-duty resources and for re-call during larger events, the on-going reliability of these resources in the future is questionable. The ability to recruit, train, and retain an effective volunteer firefighting force is becoming increasingly difficult in many rural communities. Though volunteer agencies are active in many areas across the nation, the number of active members is falling at an alarming pace.

In 2020 the number of active volunteer firefighters reached its all-time low.[28] A number of factors have contributed to this decline, including increasing time demands, more rigorous training requirements, and the economic constraints that limit the time an individual is available to commit to providing volunteer firefighting services. In addition, the predominance of EMS as the primary service responsibility requires a full-time service force rather than an on-call arrangement that lends itself to volunteer commitment.

Ottawa has struggled in its ability to maintain sufficient numbers in its volunteer force. At the time of this analysis, OFD had only five active volunteers. The Fire Department sets a two-hour monthly training requirement for its volunteers along with a minimum of eight hours of monthly ride time. Volunteers receive nominal payment for their services but they often leave the volunteer ranks and move to full-time firefighter employment either within OFD or at neighboring agencies. In discussions with the OFD Volunteer Coordinator, we found that most volunteers struggle to meet the ride-time and training requirements and often are unable to respond when off-duty to larger events. In 2022, OFD received approximately 462 of service hours from all its volunteers. This amount equates to approximately 16 percent of the time that a single full-time firefighter is typically on duty. Though a number of agencies have been creative in providing incentives to recruit and maintain volunteers, there is an ongoing struggle to recruit and retain volunteers that is likely to continue into the future. Because of this ongoing struggle in the utilization of volunteers, CPSM believes that the creation of a Reserve Force from the city workforce, as described above, or the hiring of part-time employees will be a much more viable approach to supplement fire department resources.

There are, however, other areas of volunteer services that may prove beneficial in Ottawa. Oftentimes, retired fire personnel seek out volunteer duties that are more support in nature rather than active duty as an emergency responder. These areas of supplemental volunteer services often involve logistical support in fleet maintenance and upkeep, training rolls, inspection and public education duties, along with plans review and fire investigations. CPSM believes that OFD should continue to maintain its volunteer force but it should consider other support roles for these personnel.

Call Activities

In addition to having sufficient resources available to respond to larger events, it is equally important that on-duty resources are utilized safely and efficiently in responding to EMS and fire service-related calls for assistance. The key to organizational efficiency and the safety of responding personnel is directly related to response activities and departmental deployment practices. OFD is doing a very good job in responding the fewest number of units to those incidents that are non-emergency or are public service-related. Our evaluation indicates that, overall, OFD is responding one unit to nearly 90 percent of all responses (98 percent of EMS calls and 45 percent of fire calls). It is understandable that Ottawa is responding multiple units to fire incidents given the limited number of personnel on-duty at any given time.

28. Volunteer Fire Service Fact Sheet, The National Volunteer Fire Council (NVFC)2022, p.2

FIGURE 5-4: Number of Units Dispatched, EMS

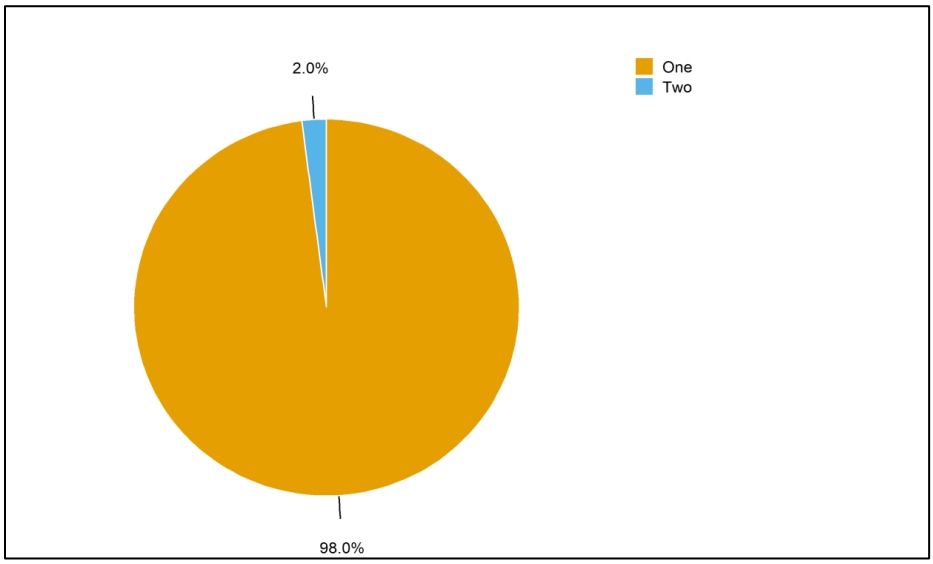


FIGURE 5-5: Number of Units Dispatched, Fire

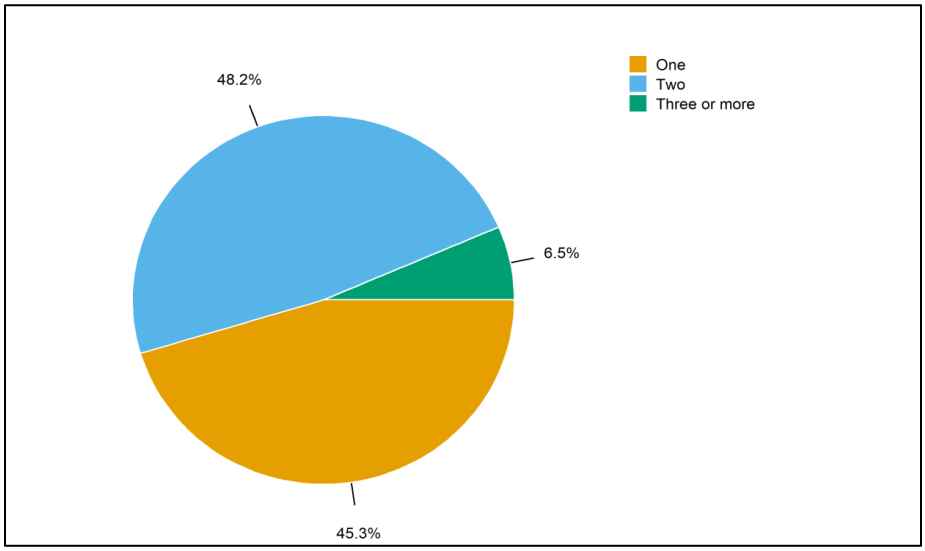


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TABLE 5-1: Calls by Call Type and Number of Units Arriving

Call Type	Number of Units			Total Calls
	One	Two	Three or More	
False alarm	44	87	7	138
Good intent	44	18	4	66
Hazard	23	30	2	55
MVA	14	12	1	27
Outside fire	6	18	5	29
Public service	55	17	1	73
Structure fire	3	19	7	29
Fire Subtotal	**189**	**201**	**27**	**417**
EMS	**1,306**	**26**	**0**	**1,332**
Aid given	47	4	2	53
Canceled	33	6	0	39
Total	**1,575**	**237**	**29**	**1,841**
Percentage	**85.6**	**12.9**	**1.6**	**100.0**

Note: Only calls with arriving OFD units were considered. There were 214 calls where an OFD unit recorded an en route time but no unit recorded an arrival time. This included 177 canceled calls, 23 aid given calls, nine EMS calls, and five fire calls.

The following table shows the aggregate call totals for the 12-month period evaluated. EMS calls represent the largest percentage of calls for service at more than 76 percent, when canceled and mutual aid calls are excluded. This predominance of EMS call activity is not unusual when compared to what we usually observe in many communities. Our experience is that EMS-related calls typically account for more than 75 percent of the call activity; in some communities with a larger senior citizen demographic, this number can go as high as 80 to 85 percent. While fire calls in Ottawa represent approximately 20.5 percent of all calls for service, actual fires (structural and outside) represent only 2.8 percent of the overall call activity. Hazard, false alarms, good intent, and public service calls represent the largest percentage of the fire calls (85 percent). This is also very typical in CPSM's data and workload analyses of other fire departments.

It must be pointed out, however, that during most of the period of our evaluation (January through October), OFD altered its deployment and responded only from Station 1. In addition, Franklin County EMS resources were not co-located at Station 1 during this timeframe. This was a decision made in response to the COVID pandemic and the desire to separate OFD employees from Franklin County EMS employees. Though the overall response times during the one-year evaluation period were exceptional, there were a higher number of extended response times in the southern areas of the city during the evaluation period.

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TABLE 5-2: Calls by Type

Call Type	Total Calls	Calls per Day	Call Percentage
False alarm	141	0.4	6.9
Good intent	67	0.2	3.3
Hazard	55	0.2	2.7
MVA	27	0.1	1.3
Outside fire	29	0.1	1.4
Public service	74	0.2	3.6
Structure fire	29	0.1	1.4
Fire Subtotal	**422**	**1.2**	**20.5**
EMS	**1,341**	**3.7**	**65.3**
Aid given*	76	0.2	3.7
Canceled	216	0.6	10.5
Total	**2,055**	**5.6**	**100.0**

Note: *Calls that occurred outside OFD's fire district were labeled as aid given. Out of 76 aid given calls, 18 were canceled.

In looking in more detail at the **29 structure fires**, it was determined that for ***16*** of these events, there was ***no reported fire damage***. This indicates that many structure fires are minor and in some instances the fire was out upon arrival of the OFD or the fire was contained to a cooking appliance, the kitchen sink, or a trash receptacle. When we looked at the time spent on structure fire incidents, we found that on 20 of the 29 structure fires and 28 of the 29 outside fires, the call duration for these incidents was 60 minutes or less. This is indicative of a relatively minor occurrence. However, nine structure fire calls saw a duration of greater than one hour and three lasted for more than two hours. This would indicate a more significant event. The following figure shows the locations of structure fires in Ottawa during our study period.

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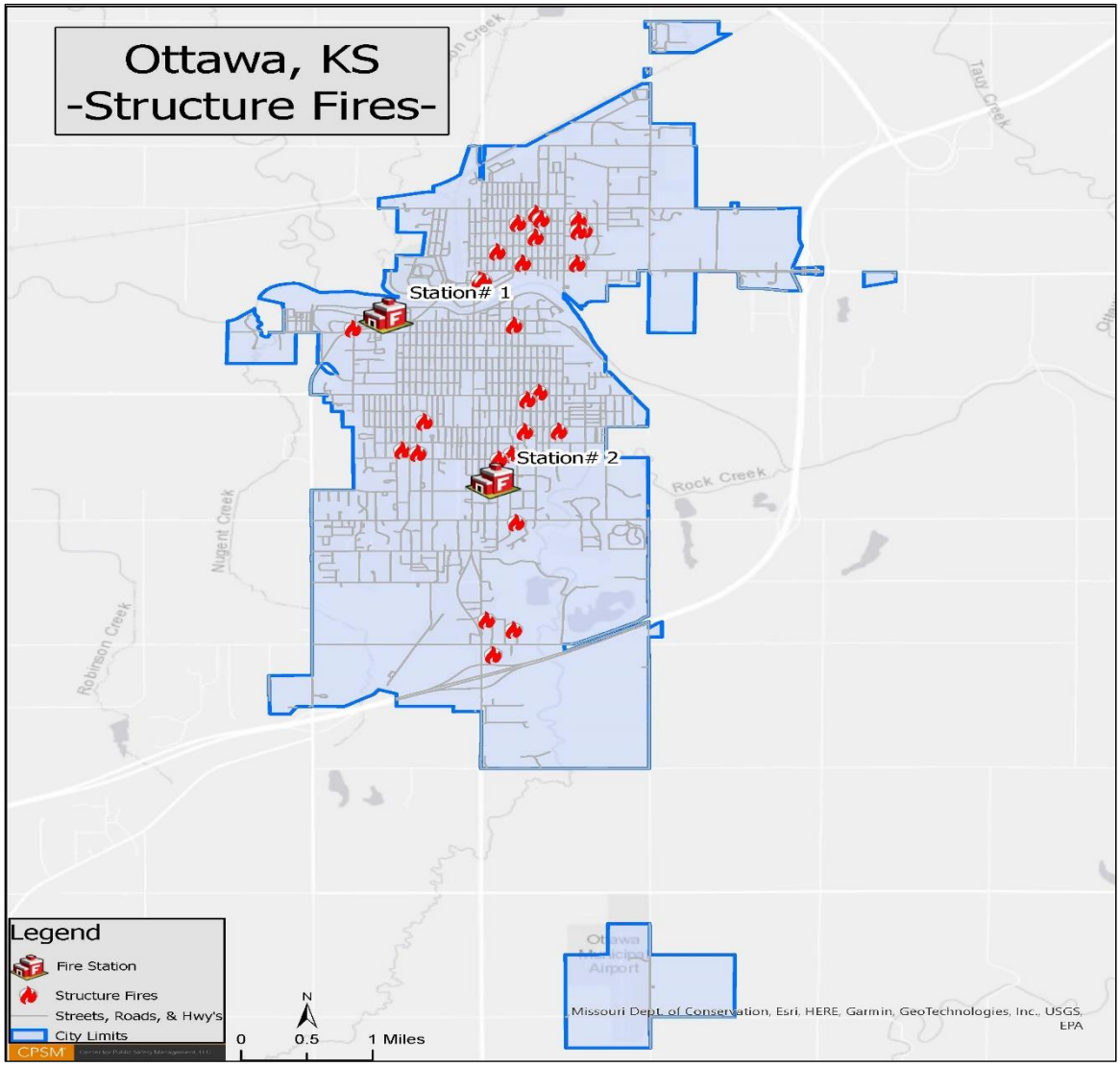
FIGURE 5-6: Location of Structure Fires



There were 13 structure fires in which some degree of fire damage was noted in the incident report. The total fire loss (structure and contents) for all structural fires in the 12-month evaluation period was estimated to be $239,100. Fire damage estimates are made by OFD investigators and company officers.

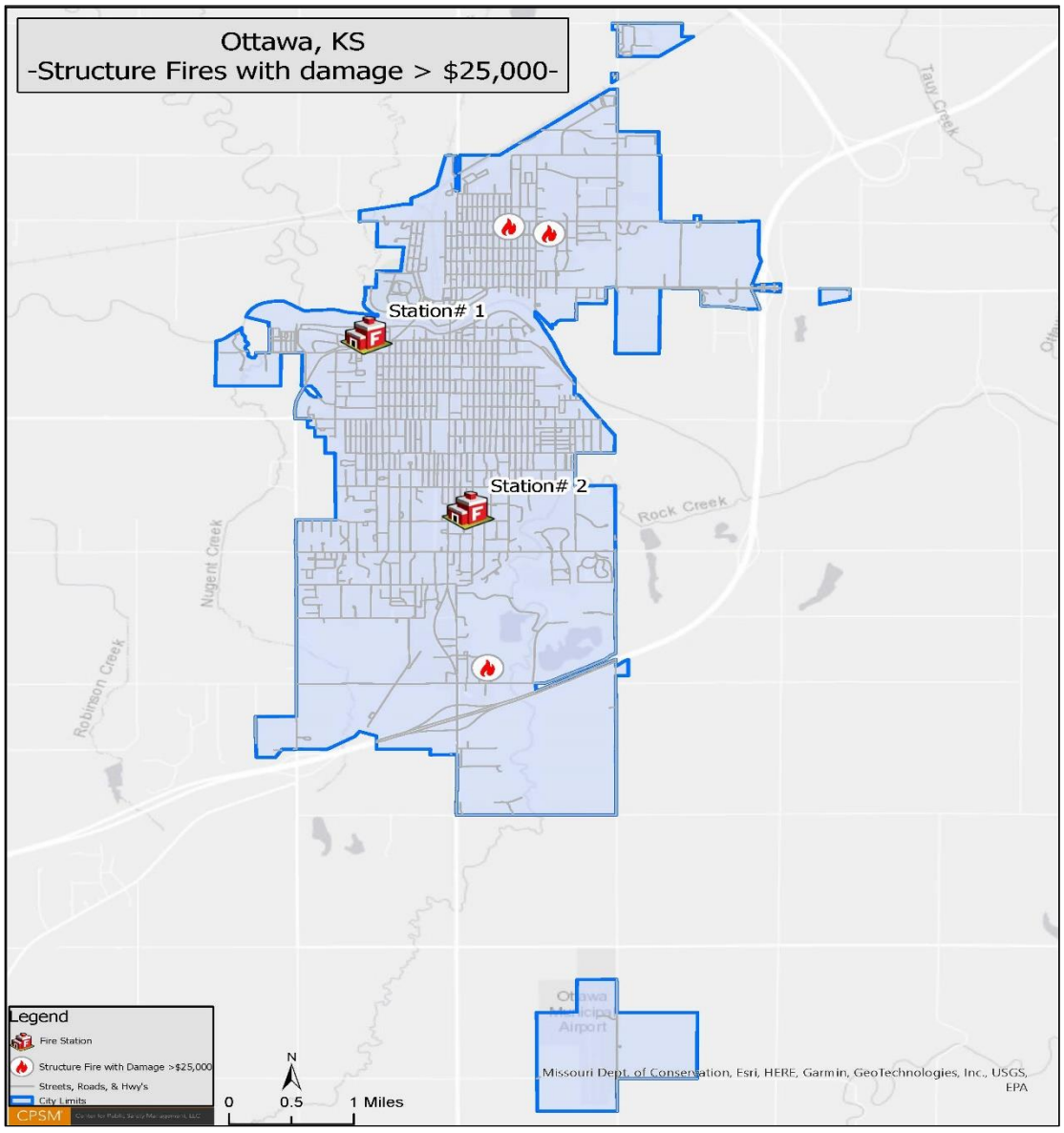
For the calls in which damage was reported (structure and contents), we estimate that the average damage for each fire was approximately $8,245. We can compare this experience to average fire loss nationwide for structure fires. NFPA estimates that in 2021 the average fire loss for a structure fire in the U.S. was $26,200.[29] From this perspective ***the average fire loss in Ottawa is significantly lower than the amount of loss found in many communities across the nation.***

Another indication that we use in our analysis of structure fire occurrence is the frequency in which an individual event results in a combined loss that exceeds $25,000. The $25,000 demarcation is relevant from two perspectives. First, this is a dollar amount that is comparable to

29. Shelby Hall and Ben Evarts, "Fire Loss in the United States during 2021," NFPA September 2022.

the national average for fire loss in a structure fires, and second, it indicates a fire loss that from CPSM's perspective is representative of a more significant fire event that requires fire department extinguishment. In the period evaluated, there were ***three structure fires in which the combined fire loss was $25,000 or greater.***

FIGURE 5-7: Location of Structure Fires with Fire Loss Greater Than $25,000



The largest combined fire loss (structure and contents) for a single event was $77,000. The average fire loss and the frequency of higher loss fires appears lower in Ottawa than what would be expected. It is hard to fully determine the reason(s) for the number of fires that resulted in the lower relative loss in Ottawa. CPSM believes that this level of loss is a product of the effectiveness of the firefighting efforts in Ottawa and the infrequency of actual fire events. It is important to note that there was an additional $188,641 in combined fire loss from outside fires in this same period in Ottawa. Outside fires typically include fires in various vehicles (passenger, RVs, heavy equipment and trucks). Twelve of the 29 outside fires involved some type of vehicle fire and these accounted for the majority of this fire loss.

The following two tables provide an analysis of fire loss in Ottawa during the year-long evaluation period.

TABLE 5-3: Content and Property Loss, Structure and Outside Fires

Call Type	Property Loss		Content Loss	
	Loss Value	Number of Calls	Loss Value	Number of Calls
Outside fire	$186,691	11	$1,950	5
Structure fire	$175,250	11	$63,850	11
Total	**$361,941**	**22**	**$65,800**	**16**

Note: The table includes only fire calls with a recorded loss greater than 0.

TABLE 5-4: Total Fire Loss Above and Below $25,000

Call Type	No Loss	Under $25,000	$25,000 plus	Total
Outside fire	18	9	2	29
Structure fire	16	10	3	29
Total	**34**	**19**	**5**	**58**

Observations:

- 18 outside fires and 16 structure fires had no recorded losses.
- Two outside fires and three structure fires had $25,000 or more in recorded losses.
- Outside fires:
  - The highest total loss for an outside fire was $120,000.
  - The average total loss for all outside fires was $6,505.
  - Five outside fires recorded content loss with a combined $1,950 in losses.
  - Out of 29 outside fires, 11 had recorded property losses, with a combined $186,691 in losses.
- Structure fires:
  - The highest total loss for a structure fire was $77,000.
  - The average total loss for all structure fires was $8,245.
  - 11 structure fires recorded content losses with a combined $63,850 in losses.
  - Out of 29 structure fires, 11 had recorded property losses, with a combined $175,250 in losses.

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EMS calls make up the predominant workload within the OFD system. As already mentioned, nearly 76 percent of the call activities reviewed (when canceled and mutual aid calls are excluded), involved EMS-related responses (including MVAs).

OFD operates in a two-tiered EMS delivery system in cooperation with Franklin County EMS. Franklin County EMS is a county agency and is a fully integrated healthcare provider. Franklin County EMS has a unique working relationship with the city in that the agencies' resources are co-located at the two fire stations that operate within city limits. Station 1 is a city-owned facility and a single EMS transport unit operates from this facility. Station 2 is a county-owned owned facility that houses both city firefighters and county EMS providers. CPSM believes that the current working relationship with Franklin County is excellent and creates a cooperative and effective system in delivering EMS and other emergency services. CPSM recognizes this cooperative arrangement between OFD and Franklin County EMS as a ***Best Practice.***

Evaluating BLS First Response Capabilities

Many fire and EMS agencies often struggle with the question of whether they should maintain EMS first response at the BLS level or if their system would be improved if upgraded to an ALS-level first response.

Currently, most OFD employees are trained and capable of providing "***Advanced***" EMT services. In this capacity personnel receive additional training and are able to start IVs and administer a limited number of cardiac related drugs along with medications utilized in the treatment of drug overdose. In addition, Franklin County EMS is housed at the same two facilities as OFD and both agencies jointly respond to most incidents, providing nearly immediate access to advanced life support services (Paramedic Care). EMT-Advanced first response is a high level of EMS care and in most instances is sufficient to provide the treatment that is needed for optimum patient care. It must also be pointed out that all Franklin County units are staffed with paramedics and provide ALS care at all times.

CPSM has observed a number of ALS first response systems that are beginning to question the effectiveness of ALS first response over BLS first response. In fact, a number of recent clinical studies have found that there are limited impacts on patient outcomes when EMS first response services are at the BLS level vs. ALS.[30] The ability to provide ALS first response care is significantly more expensive than BLS first response. These costs are a result of the additional equipment that is required in the delivery of ALS care and the level of training required for paramedics versus EMTs. In addition, most systems have higher pay scales for paramedics and typically there are more educational requirements needed to maintain these certifications.

CPSM believes that the current deployment of Advanced EMTs is very effective in Ottawa and should not be changed.

30.https://www.researchgate.net/publication/51110389_Advanced_life_support_versus_basic_life_support_in_the_pre-hospital_setting_A_meta-analysis
https://www.ems1.com/bls/articles/bls-is-more-than-basic-its-fundamental-to-good-care-vUccOufXAABcGUQW/#:~:text=They%20found%20no%20substantial%20difference,(60.1%25%20v%2051.2%25).
https://www.jems.com/special-topics/assumptions-discredit-als-vs-bls-study/

EMS Response Mode

Another key concept in prehospital emergency medical care that has evolved as more evidence-based research has become available is that faster response times improve patient outcomes.

Four recent studies evaluated the impact of response times on patient outcomes; findings consistently point to the fact that there is very little, if any association, between the speed of the EMS response and patient outcomes.[31] Further, a 2008 statement developed by the Consortium of U.S. Metropolitan Municipalities EMS Medical Directors published in *Pre-hospital Emergency Care Journal* contains the following:

> *"Over-emphasis upon response-time interval metrics may lead to unintended, but harmful, consequences (e.g., emergency vehicle crashes)."*[32]

Many EMS systems have revised their response time criteria and moved more to a quality-based evaluation of EMS care while deemphasizing the speed of response as a proxy for quality service. These systems liberally use non-lights and siren responses and reserve precious ALS first response resources for the few calls in which the rapid arrival of an EMS unit may make a life-or-death difference. The key component in making this distinction is the utilization of an effective and coordinated call screening and emergency medical dispatching process.

A recent report compiled by the National Highway Traffic Safety Administration (NHTSA), "Lights and Sirens Use by Emergency Medical Services (EMS): Above All Do No Harm,"[33] revealed that ***HOT responses are inherently dangerous***, do not result in changes of patient outcomes, and should be limited to only time-life critical events. The study goes on to recommend that HOT responses should be less than 50 percent of all EMS responses.

Our observations and national statistics indicate that when medical priority dispatching systems are fully functional, the number of Priority 1 calls that necessitate a "HOT" response are dramatically reduced. We have also observed in a number of EMS delivery systems that responding fire officers and paramedics are given the latitude to alter their mode of response on the basis of the dispatch call-screening process and dispatcher notes and their familiarity with the caller.[34] As a result of this discretion, the ensuing response patterns have been altered so that "HOT" responses are being reduced significantly to about 20 percent of the total EMS call activity.[35]

In addition to modifying the response mode, there is also the option to actually ***eliminate*** the fire department's response completely for those very minor EMS call types or public assist calls in which a single ambulance response is sufficient. This point is critical, as government entities are frequently faced with requests for additional EMS response capabilities because of the volume of EMS call activity. The following figure is a graphic developed by the International Academies of Emergency Dispatch that provides guidance regarding the mode of response and resources deployed on the basis of the call-screening and call-prioritization process.

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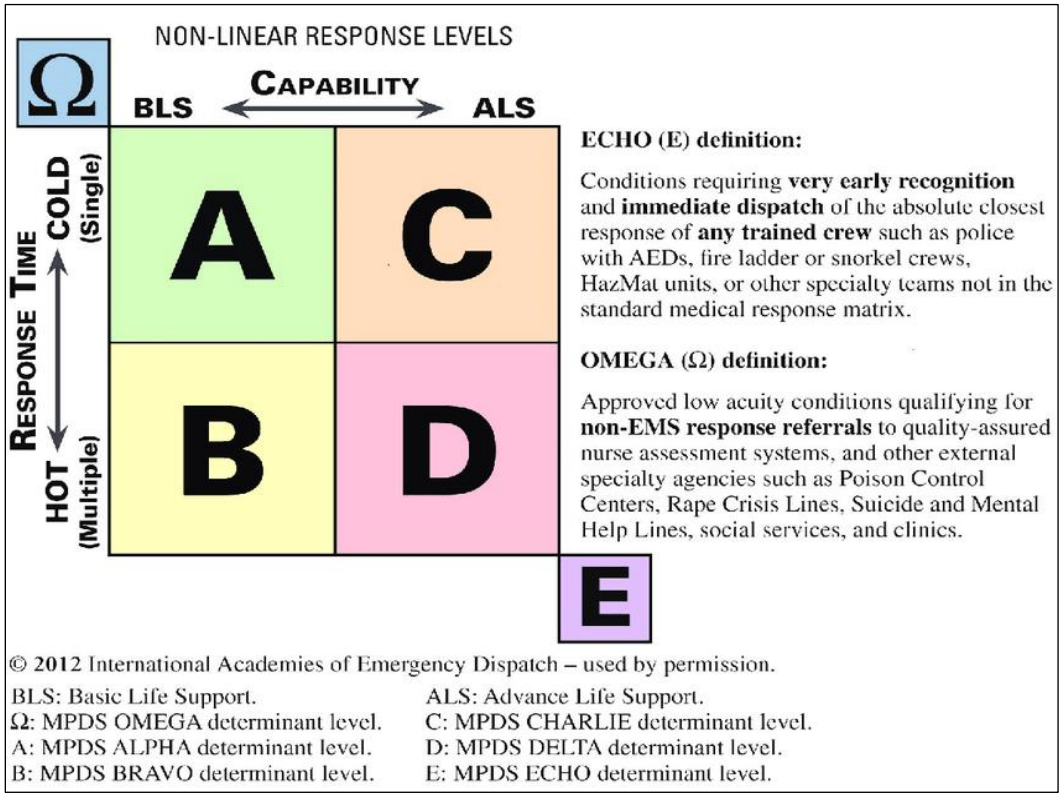
31. See: https://www.ncbi.nlm.nih.gov/pubmed/15995089
https://www.ncbi.nlm.nih.gov/pubmed/19731155
https://www.ncbi.nlm.nih.gov/pubmed/12217471
https://www.ncbi.nlm.nih.gov/pubmed/11927452
32. Prehospital Emergency Care 2008;12:141–151
33. https://www.ems.gov/pdf/Lights_and_Sirens_Use_by_EMS_May_2017.pdf
34. See Sugar Land Fire-Rescue, a suburb of Houston, TX.
35. Ibid.

FIGURE 5-8: MDPS Response Matrix



BLS: Basic Life Support.
Ω: MPDS OMEGA determinant level.
A: MPDS ALPHA determinant level.
B: MPDS BRAVO determinant level.
ALS: Advance Life Support.
C: MPDS CHARLIE determinant level.
D: MPDS DELTA determinant level.
E: MPDS ECHO determinant level.

The Franklin County Emergency Communication Center is currently determining if the call is ALS or BLS and also making the distinction between emergency and non-emergency calls. In addition, OFD units respond hot to most fire-related calls (i.e., automatic fire alarms, good intent and public service calls) that typically are non-emergency. CPSM believes that there are as many as 1,000 calls annually that can be altered to a COLD response in the Ottawa service area.

Recommendation: OFD should work with the Emergency Communications Center to implement response protocols that alter the OFD response mode when calls are determined to be minor or non-emergency. (Recommendation No. 18.)

The ability to modify the emergency unit response or even eliminate some responses is important from a safety perspective as well as a means to improve efficiency. The capacity currently exists to make this determination regarding call severity at the dispatch level. It would merely take a policy directive on the part of the Ottawa Fire Department to implement this important policy change for both Fire and EMS response protocols.

MUTUAL AID/AUTOMATIC RESPONSE

Local governments use many types of intergovernmental agreements to enhance fire protection and EMS services. These arrangements take various shapes and forms and range from a simple automatic response agreement that will respond a single unit to a minor vehicle accident or EMS call, to a more complex regional hazardous materials team or a helicopter trauma service that involves multiple agencies and requires a high level of coordination.

It is important that fire departments are able to quickly access extra and/or specialized resources to manage significant events. In addition, because these types of incidents do not respect jurisdictional boundaries, they often require a coordinated response. Sharing resources also helps departments reduce costs without impacting service delivery. All of these situations point to the need for good working relationships with other fire and EMS organizations.

The Ottawa Fire Department is the only career fire department in Franklin County and all neighboring communities utilize volunteer or combination departments. Subsequently, OFD is frequently called upon to provide its resources throughout the county and throughout the region (approximately 76 times, or 3.7 percent of all calls). Ottawa works closely with Franklin County Emergency Management and neighboring volunteer companies in protecting these communities and the process is extremely effective considering the limited resources available.

TABLE 5-5: Mutual Aid Given by OFD

Zone	Calls	Percent Calls	Runs	Runs Per Day	Minutes Per Run	Work Hours	Percent Work	Minutes Per Day
Cutler Fire	6	0.3	11	0.0	15.2	2.8	0.4	0.5
LOH Fire	43	2.1	54	0.1	30.5	27.5	3.5	4.5
Northwest Fire 1	6	0.3	6	0.0	42.4	4.2	0.5	0.7
Ohio Fire	2	0.1	2	0.0	10.2	0.3	0.0	0.1
Pottawatomie Fire	1	0.0	1	0.0	3.9	0.1	0.0	0.0
Richmond Fire	6	0.3	6	0.0	31.7	3.2	0.4	0.5
Wellsville Fire	7	0.3	7	0.0	30.2	3.5	0.5	0.6
Williamsburg Fire	5	0.2	7	0.0	110.3	12.9	1.7	2.1
Total	**76**	**3.7**	**94**	**0.3**	**34.8**	**54.5**	**7.0**	**9.0**

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WORKLOAD ANALYSIS

The current workload being handled by the Ottawa Fire Department is relatively light, with neither of the primary response units experiencing exceedingly high call volumes. ***CPSM considers units responding to fewer than 1,000 calls annually as having a low workload***. Overall, OFD units are responding to approximately 5.6 calls each day.

The OFD operates from two fire stations, with each station operating a single fire unit. In most instances, the staffing levels on these combined units is only four personnel (three on E-1 and one on E-2). Combined, these units handled nearly 2,055 calls for service in the one-year period covered by this report. These 2,055 calls generated 2,494 runs or unit responses. In many of these incidents additional units were staffed by the re-call of off-duty personnel or from mutual aid resources. On any given call there can be multiple unit responses or "runs." For example, a single structure fire call will typically generate a response of three to four units. It must be pointed out that of the 2,494-unit responses, Engine 1 responded just over 1,000 times in the 12-month evaluation period (1,008 runs). Engine 2 responded just over 700 times in that same timeframe.

Given the relatively short call durations for both fire and EMS calls (average of 18.7 minutes), the cumulative in-service time associated with this call activity was not very high. The next two tables show the annual runs, call types, and deployed time for the primary OFD response units. Of note is the column labeled "***Deployed Minutes per Day***" in Table 5-6, which shows that Engine 1, for example, which is the busiest unit in the city, was only involved in emergency response activities a total of 48.2 minutes (less than 1 hour) each 24-hour duty day (this includes the cross-staffing for Brush Unit responses). It is also important to point out that on all EMS calls, Franklin County EMS will co-respond with OFD and provide two EMS personnel.

TABLE 5-6: Annual Workload by Unit

Unit	Unit Type	Minutes per Run	Total Hours	Total Percent	Deployed Minutes per Day	Total Runs	Runs per Day
BR1	Brush	31.0	34.1	4.4	5.6	66	0.2
Eagle 1	Drone	155.3	12.9	1.7	2.1	5	0.0
Eagle 2	Drone	103.7	10.4	1.3	1.7	6	0.0
Engine 1	Engine	18.7	293.1	37.7	48.2	942	2.6
Engine 2	Engine	15.9	188.4	24.2	31.0	709	1.9
Engine 3	Reserve engine	21.3	82.9	10.7	13.6	234	0.6
Squad 1	Squad	18.0	129.9	16.7	21.3	433	1.2
Tower 1	Tower	36.8	1.2	0.2	0.2	2	0.0
Utility 2	Utility	15.3	24.7	3.2	4.1	97	0.3
Total		**18.7**	**777.7**	**100.0**	**127.8**	**2,494**	**6.8**

TABLE 5-7: Annual Runs by Unit and Type

Unit	False Alarm	Good Intent	Hazard	MVA	Outside Fire	Public Service	Structure Fire	EMS	Cancel	Aid given	Total
BR1	10	4	1	0	9	1	3	17	1	20	66
Eagle 1	0	0	0	0	0	4	0	0	0	1	5
Eagle 2	0	0	0	0	0	4	0	0	0	2	6
Engine 1	131	39	50	22	26	45	27	492	77	33	942
Engine 2	98	25	31	12	19	23	24	378	80	19	709
Engine 3	27	4	9	6	4	3	4	157	15	5	234
Squad 1	5	2	2	4	2	8	6	341	53	10	433
Tower 1	0	0	0	0	1	1	0	0	0	0	2
Utility 2	3	22	2	0	3	12	1	42	8	4	97
Total	**274**	**96**	**95**	**44**	**64**	**101**	**65**	**1,427**	**234**	**94**	**2,494**

Frequency of Overlapping Calls

When we look at the frequency of call activity in Ottawa the pattern observed is indicative of a system that is not generating frequent overlapping calls***. Most systems attempt to achieve an availability rate of between 85 and 90 percent.*** This means that on 85 to 90 percent of the calls, a unit is available to respond to an incident originating in its first due area. The data in Ottawa indicates that in less than 6 percent of the time (about 121 calls annually) there are two calls overlapping. In only 4 instances did we observe three calls overlapping. However, given the relatively short call duration in Ottawa (18.7 minutes), it is very likely that two calls can occur in an hour in the same service area and the period of unavailability is a short duration, usually 10 minutes or less.

The following table shows the frequency of overlapping calls handled by OFD units.

TABLE 5-8: Frequency of Overlapping Calls

Scenario	Number of Calls	Percent of All Calls	Total Hours
No overlapped call	1,930	93.9	587.6
Overlapped with one call	121	5.9	24.9
Overlapped with two calls	4	0.2	0.9

Another indicator of workload is the frequency with which peak service demand is occurring. Peak demand can occur when there are multiple calls occurring simultaneously or when there are larger events that draw on the system's resources and additional calls continue to occur while resources are assigned to the larger incident. All systems experience peak service demands that strain the available resources in the system. This is why it is necessary for mutual aid and joint response agreements, which help mitigate these occurrences.

The key to any deployment strategy is to have sufficient resources to handle the day-to-day call activities and have the system designed to adjust and respond effectively during those high-demand periods. In the Ottawa system, given the limited resources available and the overall call volume, we would anticipate that throughout the year there would typically be ***3 or more calls occurring within the same hour about once every 13 days***. In addition, there is also high

likelihood that during periods of high demand, there is insufficient staffing available to properly manage these incidents.

The following table has a list of the ten busiest hours in the 12-month evaluation period and the numbers of calls occurring during each of those hours. It must be pointed out that, given the relatively short call duration in Ottawa (18.7 minutes), it is very likely that two calls can occur in an hour in the same service area which do not overlap with one another.

TABLE 5-9: Top 10 Hours with the Most Calls Received

Hour	Number of Calls	Number of Runs	Deployed Hours
9/3/2022, 7:00 p.m. to 8:00 p.m.	4	6	1.3
6/3/2022, 10:00 a.m. to 11:00 a.m.	4	4	0.6
7/18/2022, 9:00 a.m. to 10:00 a.m.	4	4	0.3
7/24/2022, 7:00 p.m. to 8:00 p.m.	3	7	1.2
5/17/2022, 7:00 p.m. to 8:00 p.m.	3	6	0.8
10/29/2022, noon to 1:00 p.m.	3	5	2.0
1/11/2022, 3:00 p.m. to 4:00 p.m.	3	5	1.6
11/21/2022, 1:00 p.m. to 2:00 p.m.	3	5	1.5
5/25/2022, noon to 1:00 p.m.	3	5	1.3
12/24/2022, noon to 1:00 p.m.	3	5	1.1

Note: Total deployed hours is a measure of the total time spent responding to calls received in the hour and may extend into the next hour or hours. The number of runs and deployed hours were calculated based on all response units.

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SECTION 6. RESPONSE TIME ANALYSIS

Response times are typically the primary measurement used in evaluating fire and EMS services. Most deployment models attempt to achieve a four-minute initial travel time for both fire and EMS calls and a full-force travel time of eight minutes for fire calls. A full-force travel time indicates the time it takes for the initial response of all resources assigned to the call to arrive on the scene.

While these times have validity, the actual impact of a speedy response time is limited to very few incidents. For example, in a full cardiac arrest, analysis shows that successful outcomes are rarely achieved if basic life support (CPR) is not initiated within four minutes of the onset of the arrest. However, ***cardiac arrests occur very infrequently; on average these are 1 percent to 1.5 percent of all EMS incidents***.[36] There are also other EMS incidents that are truly life-threatening and the time of response can clearly impact the outcome. These involve drownings, electrocutions, and severe trauma (often caused by gunshot wounds, stabbings, and severe motor vehicle accidents, etc.). Again, the ***frequency of life-threatening calls is limited, typically not more than 10 to 15 percent of the overall EMS call activity***.

Regarding response times for fire incidents, the frequency of actual fires in Ottawa (structure and outside fires) is very low, approximately 2.8 percent of all incidents. ***Actual structure fires were approximately 1.4 percent of all calls, or 29 in the 12-month period evaluated***.

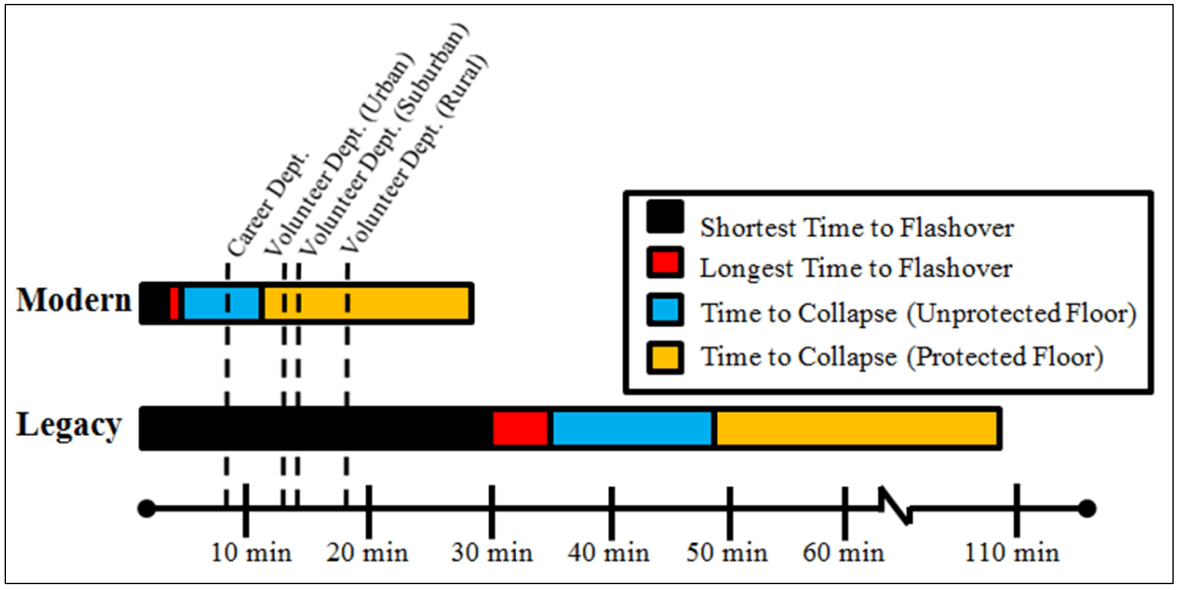
The criterion for fire response is based on the concept of "flashover." This is the state at which super-heated gasses from a fire in an enclosed area results in a near-simultaneous ignition of the combustible material in the area. In this situation, usually after an extended period of time (upwards to ten minutes), the fire expands rapidly and is much more difficult to contain. When the fire reaches this hazardous state, a larger and more destructive fire occurs.

Additional research is indicating that the speed of fire spread and the degradation to structural components is occurring much faster in modern construction.[37] The introduction of lightweight construction, increases in house size, open living areas that promote smoke and flame spread, and more flammable interior contents and construction materials, are all contributing to this outcome. The following figure is a comparison in the time to flashover when comparing modern construction with legacy or older construction methods.

Another important factor in the whole response time question is what we term "detection time." This is the time it takes to detect a fire or a medical situation and notify 911 to initiate the response. In many instances, particularly at night or when automatic detection systems (fire sprinklers and smoke detectors) are unavailable or inoperable, the detection process can be extended. Fires that go undetected and are able to expand in size, become more destructive, and are more difficult to extinguish.

36. Myers, Slovis, Eckstein, Goodloe et al. (2007)." Evidence-based Performance Measures for Emergency Medical Services System: A Model for Expanded EMS Benchmarking." *Pre-hospital Emergency Care*.
37. https://link.springer.com/article/10.1007/s10694-011-0249-2

FIGURE 6-1: Times to Flashover: Modern vs Legacy Construction Methods



MEASURING RESPONSE TIMES

There have been no documented studies that have made a direct correlation between response times and outcomes in fire and EMS events. No one has been able to show that a four-minute response time is measurably more effective than a six-minute response time. The logic has been "faster is better," but this has not been substantiated by any detailed analysis. Furthermore, the ability to measure the difference in outcomes (patient saves, reduced fire damage, or some other quantifiable measure) between a six-minute, eight-minute, or ten-minute response is not a performance measure often utilized in the fire service.

For example, in Ottawa nearly 16 percent of those calls (272 calls within the city) with measurable response times (1,727), had an initial response time of 10 minutes or higher. Though this is a significant number of calls, there is no indication that the outcomes on these calls were markedly worse than those calls with faster arrivals. So, in looking at response times it is prudent to design a deployment strategy around the actual circumstances that exist in the community and the fire problem that is perceived to exist. This requires a "fire risk assessment" and a political determination as to the desired level of protection for the community. It would be imprudent, and very costly, to build a deployment strategy that is based solely upon response times.

For the purpose of this analysis, ***response time*** is a product of three components: ***dispatch time***, ***turnout time***, and ***travel time***.

- *Dispatch time* is the time interval that begins when the alarm is received at the communication center and ends when the response information is transmitted via voice or electronic means to the emergency response facility or emergency response units in the field. Dispatch time is typically the responsibility of the 911 Center.
- *Turnout time* is the time interval that begins when the notification process to emergency response facilities and emergency response begins through an audible alarm or visual announcement or both and ends at the beginning point of travel time.

- *Travel time* is the time interval that initiates when the unit is en route to the call and ends when the unit arrives at the scene.
- *Response time*, also known as total response time, is the time interval that begins when the call is received by the primary dispatch center and ends when the dispatched unit arrives on the scene to initiate action.

OTTAWA RESPONSE TIMES

For this study, and unless otherwise indicated, our response time calculations measure the first arriving unit only. Typically, we track only those responses in which the unit is responding with lights and sirens (hot). Out of the 2,055 total calls, our response time analysis was based on a total of 1,727 calls. We excluded 76 mutual aid responses, 216 canceled calls, 14 calls where no units recorded a valid on-scene time, and 22 calls where the first arriving unit response was greater than 30 minutes. It is important to note that ***there were no calls that were run as non-emergency*** that were excluded from the response time calculations.

On the basis of these calculations, we determined:

- The average dispatch time was 1.6 minutes.
- The average turnout time was 1.5 minutes.
- The average travel time was 4.6 minutes.
- The average total response time was 7.7 minutes.
- The average response time was 7.9 minutes for EMS calls and 7.1 minutes for fire calls.
- The average response time was 7.4 minutes for outside fires and 7.0 minutes for structure fires.

According to NFPA 1710, *Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Departments,* 2020 Edition, the alarm processing time or dispatch time should be less than or equal to 64 seconds 90 percent of the time. This standard also states that the turnout time should be less than or equal to 80 seconds (1.33 minutes) for fire and special operations 90 percent of the time, and a 60-second turnout for EMS calls. Travel times are recommended to be less than or equal to 240 seconds (4 minutes) for the first arriving engine company 90 percent of the time for both fire and EMS calls. The following table shows the average and 90th percentile response time in minutes for the first arriving unit, by call type, for the OFD.

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TABLE 6-1: Average and 90th Percentile Response Time of First Arriving Unit, by Call Type

Call Type	Average Response Time, Min.				90th Percentile Response Time, Min.				Call Count
	Dispatch	Turnout	Travel	Total	Dispatch	Turnout	Travel	Total	
False alarm	1.7	1.3	4.0	7.0	2.3	2.2	6.7	9.9	137
Good intent	1.3	0.6	4.0	5.8	2.4	2.0	6.7	10.0	66
Hazard	1.6	1.4	4.9	7.8	3.0	2.3	7.4	11.3	55
MVA	1.9	1.7	4.3	8.0	4.0	2.5	7.2	12.3	26
Outside fire	1.5	1.3	4.5	7.4	2.8	2.3	7.6	12.2	29
Public service	3.1	0.6	3.8	7.5	8.3	1.8	8.4	17.6	65
Structure fire	1.4	1.9	3.6	7.0	2.3	2.9	5.3	8.3	27
Fire Subtotal	**1.8**	**1.2**	**4.1**	**7.1**	**3.0**	**2.3**	**6.8**	**10.9**	**405**
EMS	**1.5**	**1.6**	**4.8**	**7.9**	**2.3**	**2.6**	**7.1**	**10.6**	**1,322**
Total	**1.6**	**1.5**	**4.6**	**7.7**	**2.4**	**2.6**	**7.1**	**10.6**	**1,727**

Observations:

- The average dispatch time was 1.6 minutes.
- The average turnout time was 1.5 minutes.
- The average travel time was 4.6 minutes.
- The average total response time was 7.7 minutes.
- The average response time was 7.9 minutes for EMS calls and 7.1 minutes for fire calls.
- The average response time was 7.4 minutes for outside fires and 7.0 minutes for structure fires.
- The 90th percentile dispatch time was 2.4 minutes.
- The 90th percentile turnout time was 2.6 minutes.
- The 90th percentile travel time was 7.1 minutes.
- The 90th percentile total response time was 10.6 minutes.
- The 90th percentile response time was 10.6 minutes for EMS calls and 10.9 minutes for fire calls.
- The 90th percentile response time was 12.2 minutes for outside fires and 8.3 minutes for structure fires.

As stated previously, all OFD responses are currently being responded to with lights and sirens. However, in many instances, units realize that many calls are non-emergency and they slow down their response, even though the call is still being categorized as an emergency response. For example, look at the 90th percentile response times for Public Service Calls. Public Service Calls are more than double the time than those calls dispatched as Structure Fires (17.6 minutes vs 8.3 minutes). This is not an uncommon occurrence and we often see these differences in many agencies we evaluate. However, by not officially excluding these calls as emergency responses, the net effect is an overall increase in response time calculations. CPSM believes that if OFD officially downgrades its responses to non-emergency calls and excludes these calls from the emergency response time calculations, the net effect would be a decrease in emergency response times. Many agencies have taken this approach and they have adopted different

response time standards for emergency and non-emergency responses. We believe if OFD were to take this approach, the response times for emergency calls can be reduced by at least one minute.

The fire station is a critical link in service delivery and where facilities are located is the single most important factor in determining overall response times and workload distribution. As noted previously, the fire department operates from two fire stations. The OFD fire stations are located as follows:

- Station 1: 720 W. 2nd Street.
- Station 2: 219 E. 14th Street.

The next four figures illustrate the OFD station locations and estimated travel distance projections from all stations: 240 seconds (indicated by the green overlay), 360 seconds (indicated by the amber overlay), and 480 seconds (indicated by the red overlay). These projections are based on actual road travel distances and the posted speed limits on these roadways.

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FIGURE 6-2: Ottawa Station Locations with Travel Projection of 240 Seconds

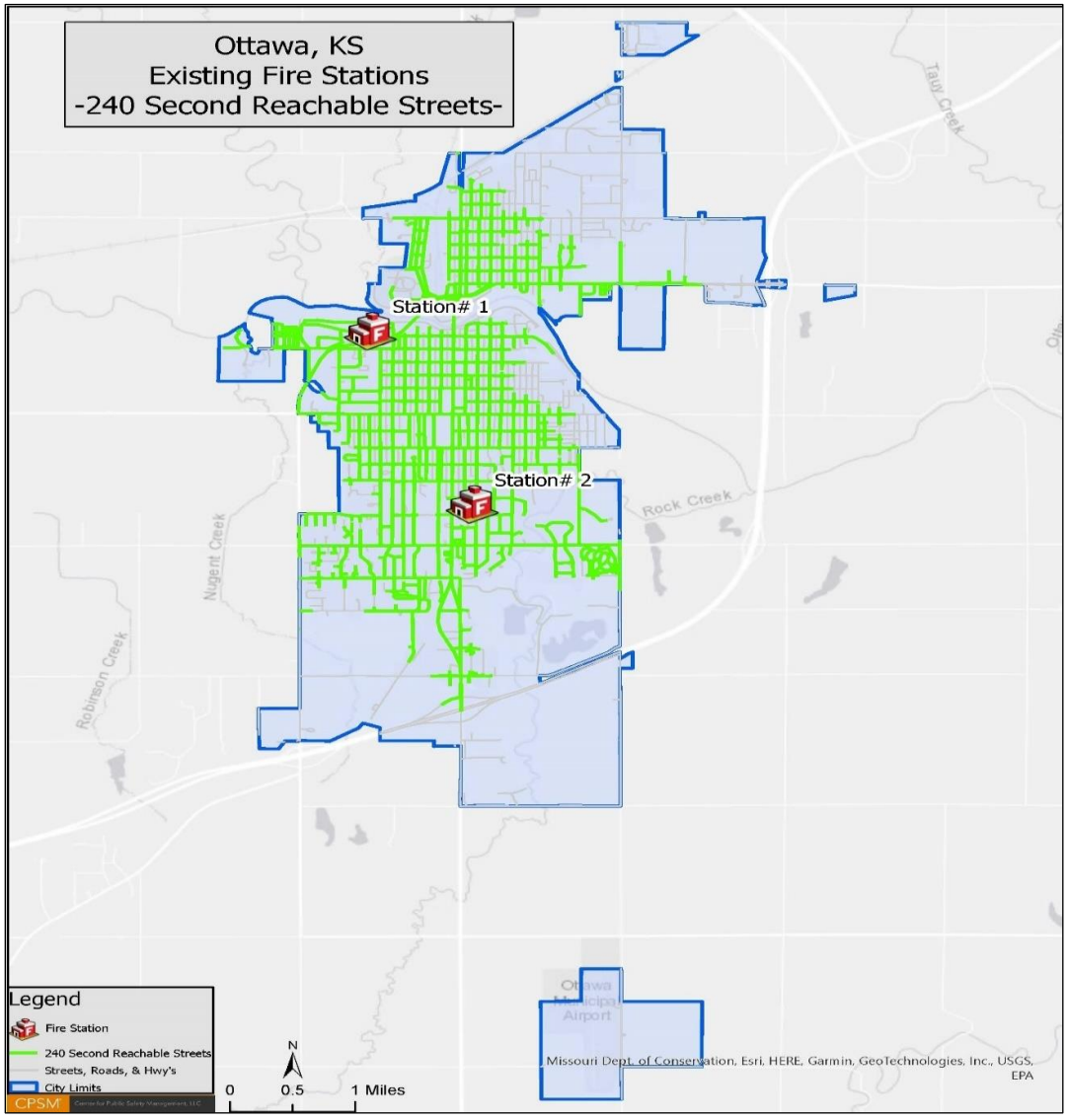

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FIGURE 6-3: Ottawa Station Locations with Travel Projection of 360 Seconds

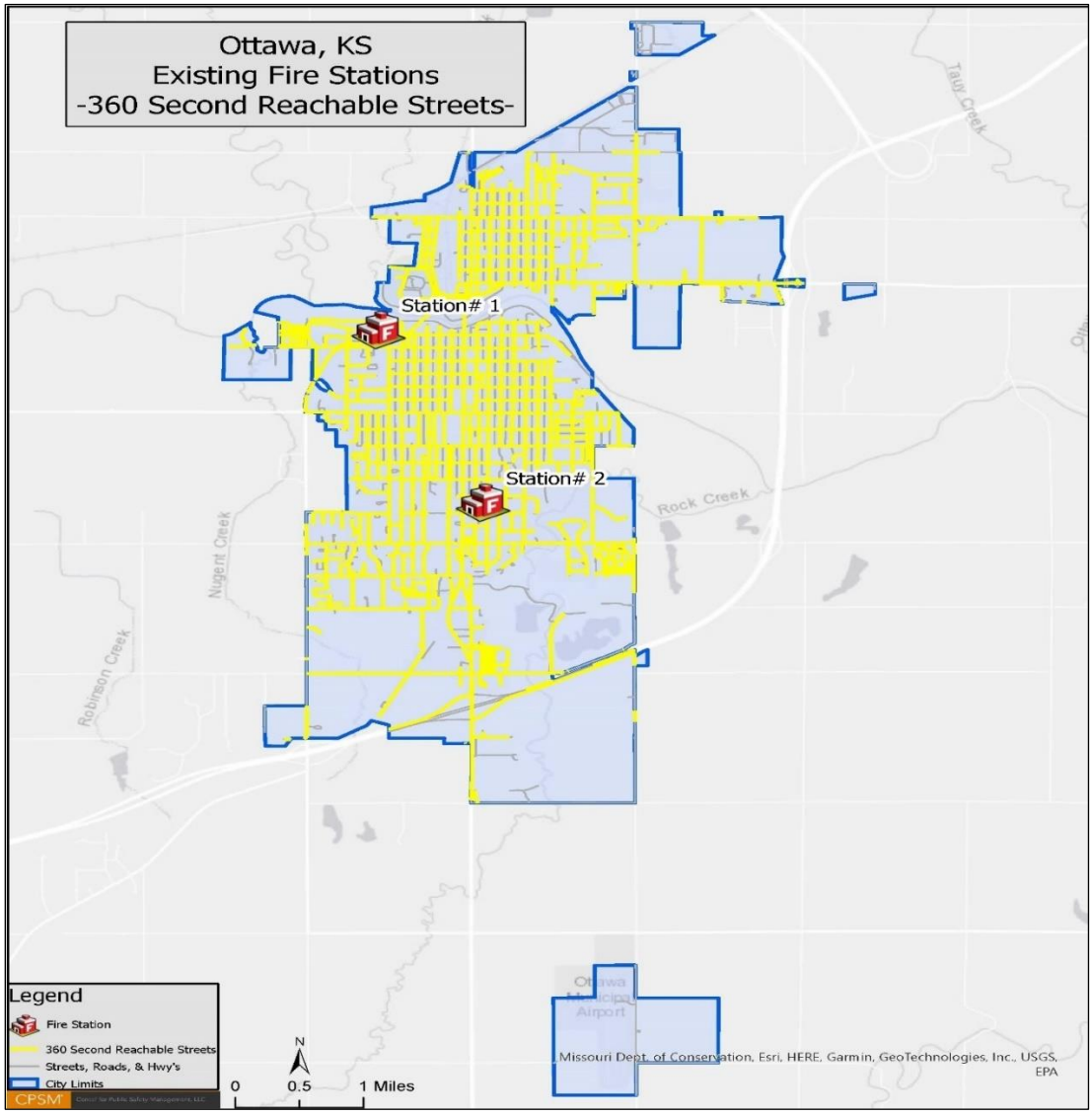

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FIGURE 6-4: Ottawa Station Locations with Travel Projection of 480 Seconds

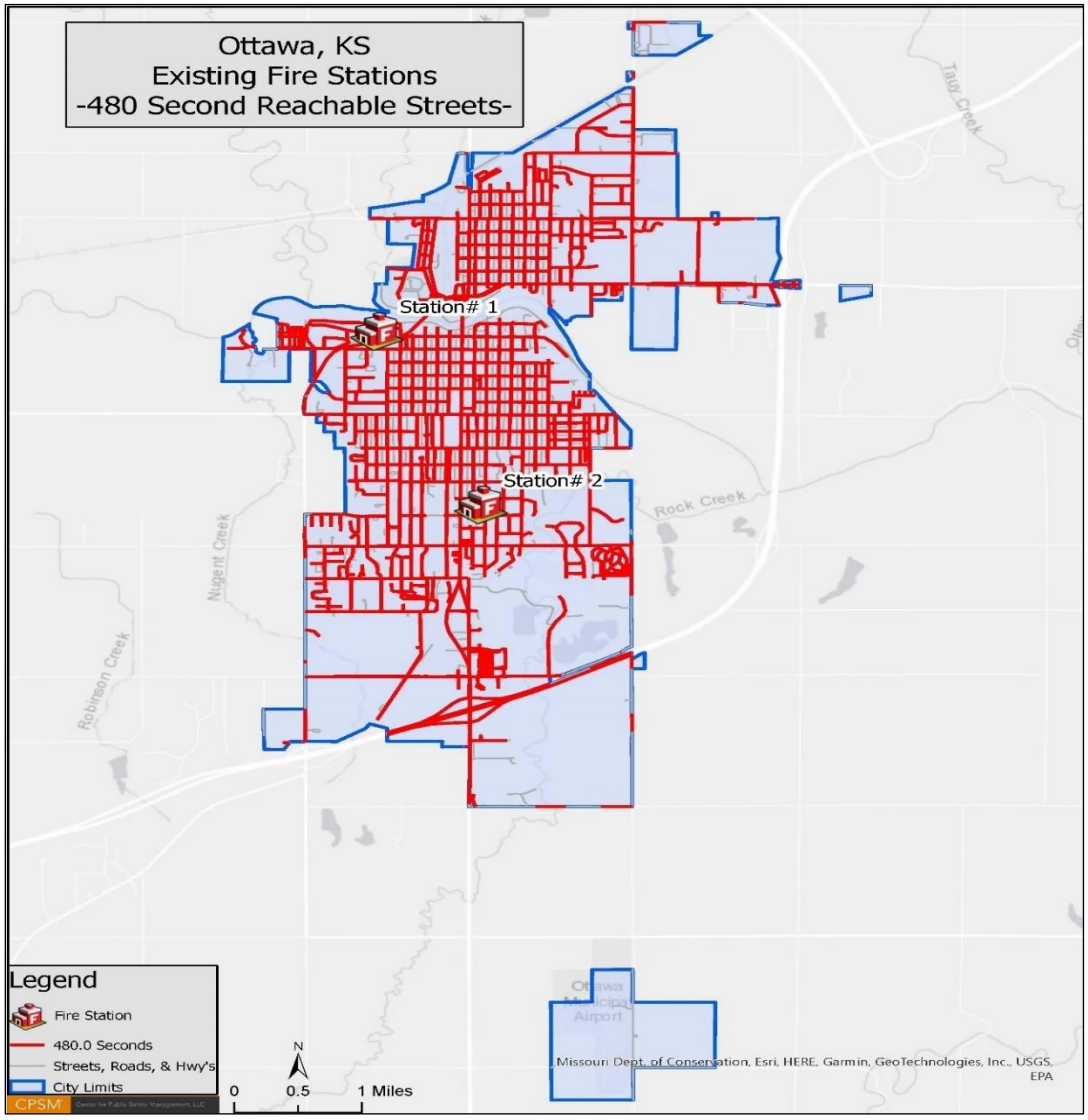

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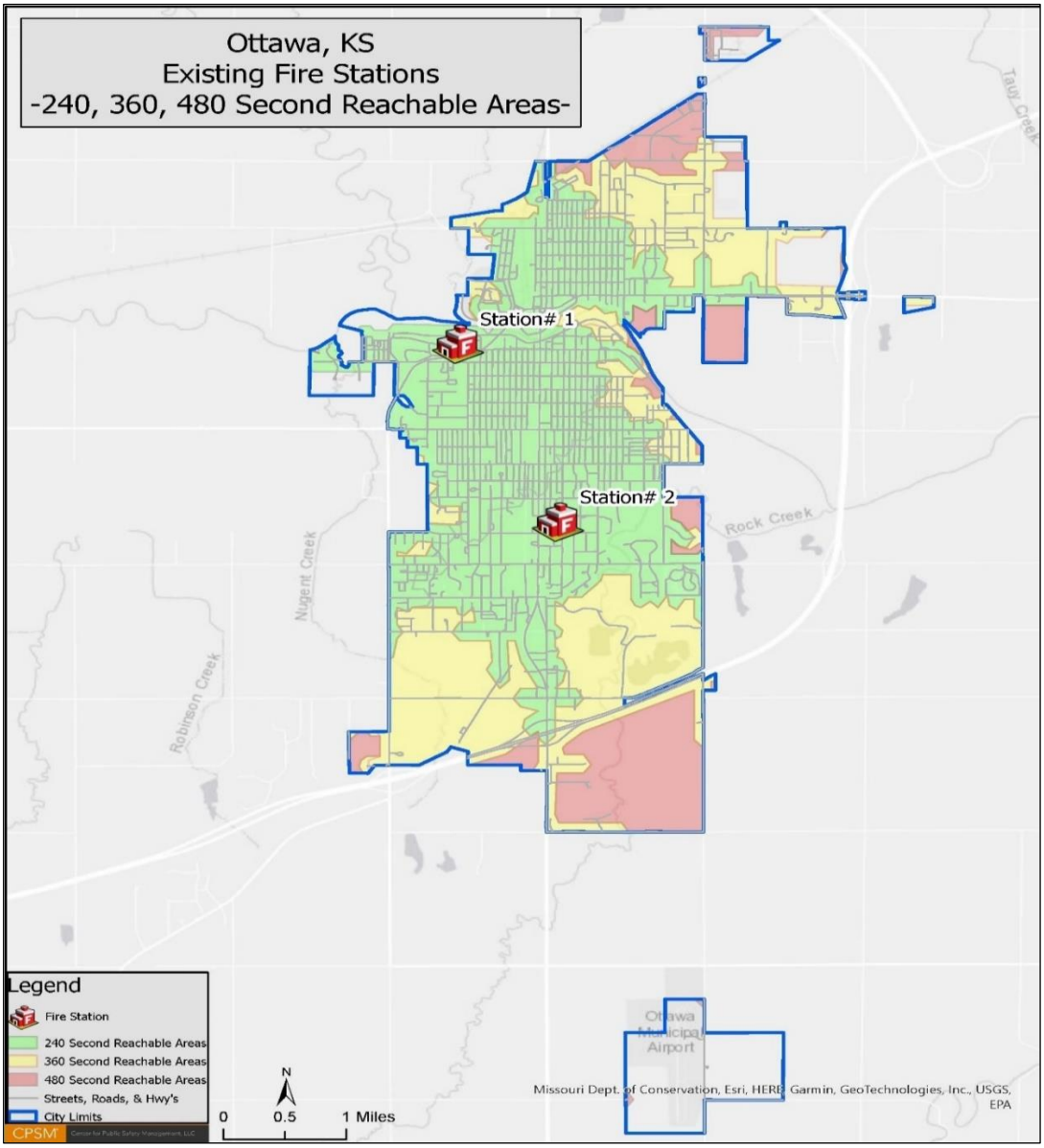
FIGURE 6-5: Ottawa Station Locations with Composite Travel Projections



The preceding figures show that approximately 50 percent to 60 percent of the developed areas of the city are covered under the 240-second benchmark. We would estimate that approximately 70 percent of the developed areas of the city are covered under the 360-second overlay and approximately 85 percent to 90 percent of the city is covered under the 480-second benchmark. ***These maps only depict travel distances and not actual response times.***

The next three figures show the actual locations of fire, EMS, and other emergency responses carried out by the Ottawa Fire Department during the year-long study period. It is apparent from these graphics that most responses in Ottawa should result in travel times that are within six to eight minutes. It also appears that the overall distribution of calls is generally concentrated in the central city areas.

FIGURE 6-6: OFD Fire Runs

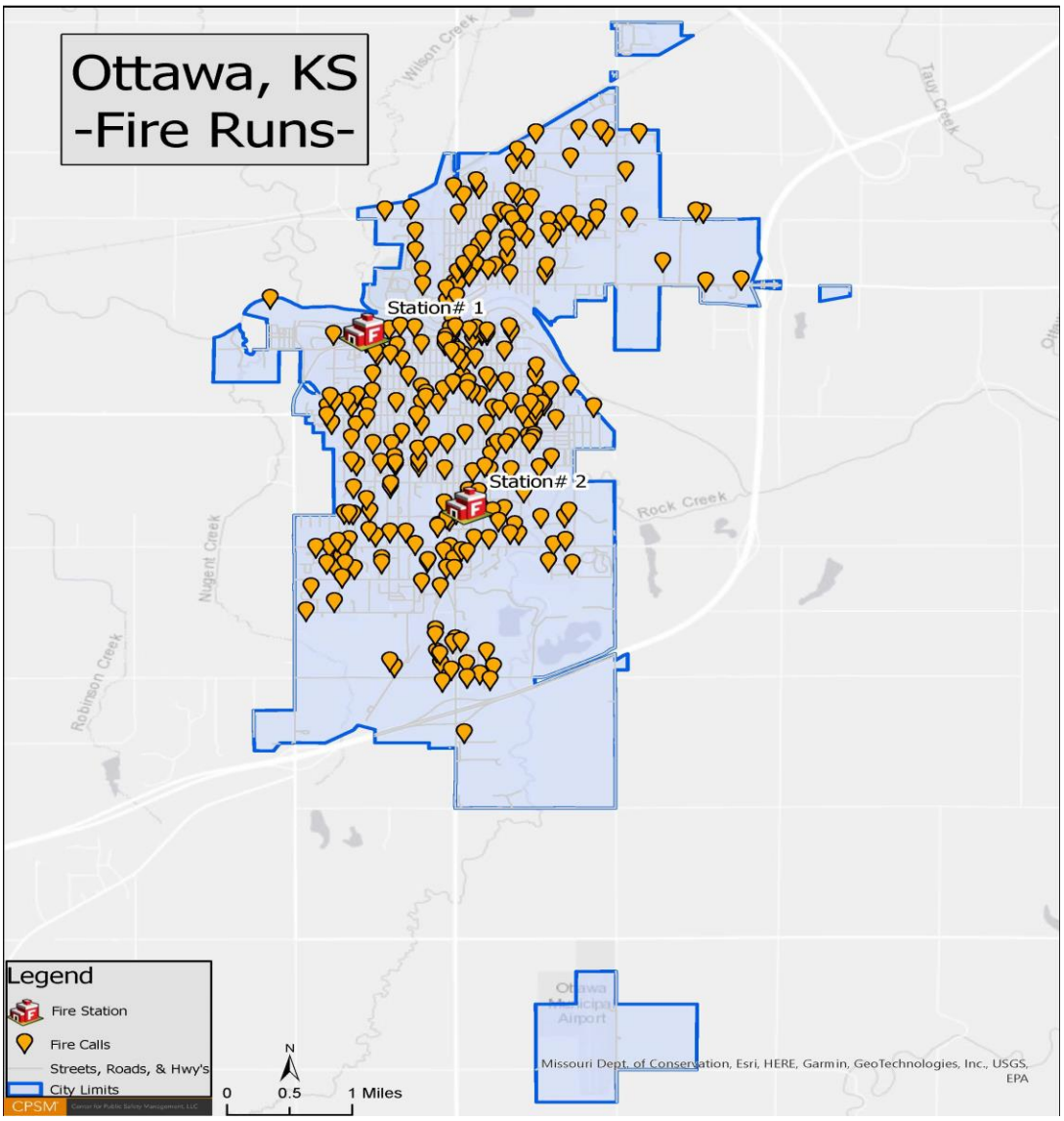


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FIGURE 6-7: OFD EMS Runs

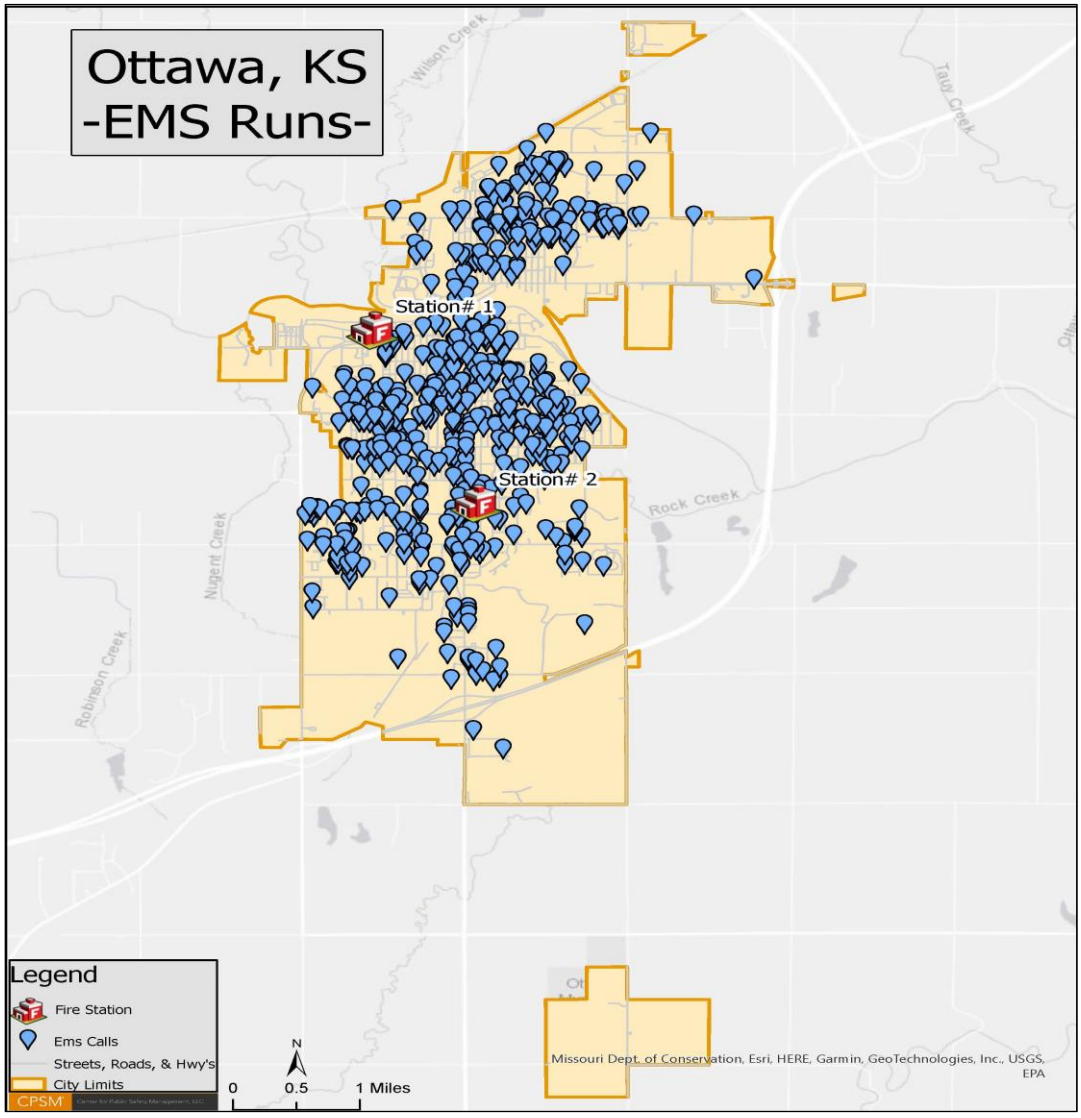

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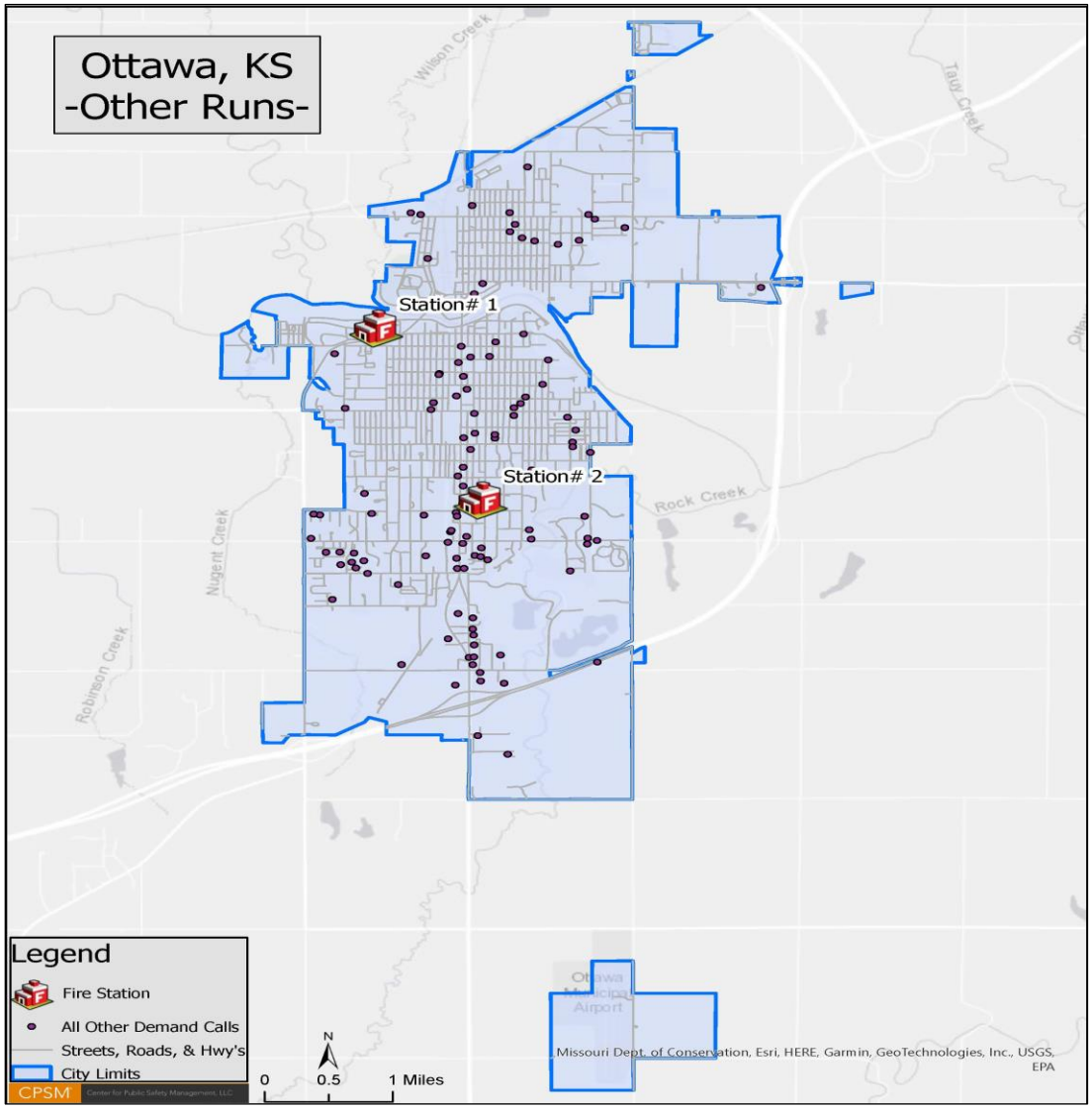
FIGURE 6-8: OFD Other Runs



In our analysis we also looked at those calls with extended total response times, that is, those response times of 10 minutes or greater within city limits. We determined that approximately 16 percent of all responses resulted in a total response time greater than 10 minutes (272 calls). The next figure illustrates the location of the estimated 272 calls that had a total response time of 10 minutes or greater.

It must be pointed out, however, that during most of the period of our evaluation (January through October), OFD altered its deployment and responded only from Station 1. In addition, Franklin County EMS resources were not co-located at Station 1 during this timeframe. This was a decision made in response to the COVID pandemic and the desire to separate OFD employees from Franklin County EMS employees. Though the overall response times during the one-year evaluation period were exceptional, there were a higher number of extended response times in the southern areas of the city during the evaluation period.

It is always surprising to agencies when they see this graphic illustrating response times and question why so many calls with extended response times are located in close proximity to fire

stations. Typically, our findings indicate that when agencies do not adjust their mode of response from emergency to non-emergency on the basis of the call screening process, responding units still slow down their response when they have indications that the call is non-emergency. Though we did not evaluate closely the locations and call types for the 272 extended responses, our speculation is that many of these were responses that were purposely slowed but were still tabulated as an emergency response. As noted above, we did not exclude any calls from the response time calculations because they were classified as a non-emergency response. The following table shows the differences in response times by zone in Ottawa. Again, the average response times and the 90th percentile response times were higher in the southern fire zone (by 19 percent and 15 percent, respectively). The southern fire zone includes all points south of 7th Street east of Main Street and all points south of 9th Street, west of Main.

TABLE 6-2: Average and 90th Percentile Response Time of First Arriving Unit, by Area

Fire Zone	Average Response Time, Min.				90th Percentile Response Time, Mon.				Call Count
	Dispatch	Turnout	Travel	Total	Dispatch	Turnout	Travel	Total	
North	1.5	1.4	4.0	7.0	2.3	2.6	6.3	9.7	829
South	1.6	1.5	5.2	8.3	2.4	2.5	7.4	11.2	898
Total	**1.6**	**1.5**	**4.6**	**7.7**	**2.4**	**2.6**	**7.1**	**10.6**	**1,727**

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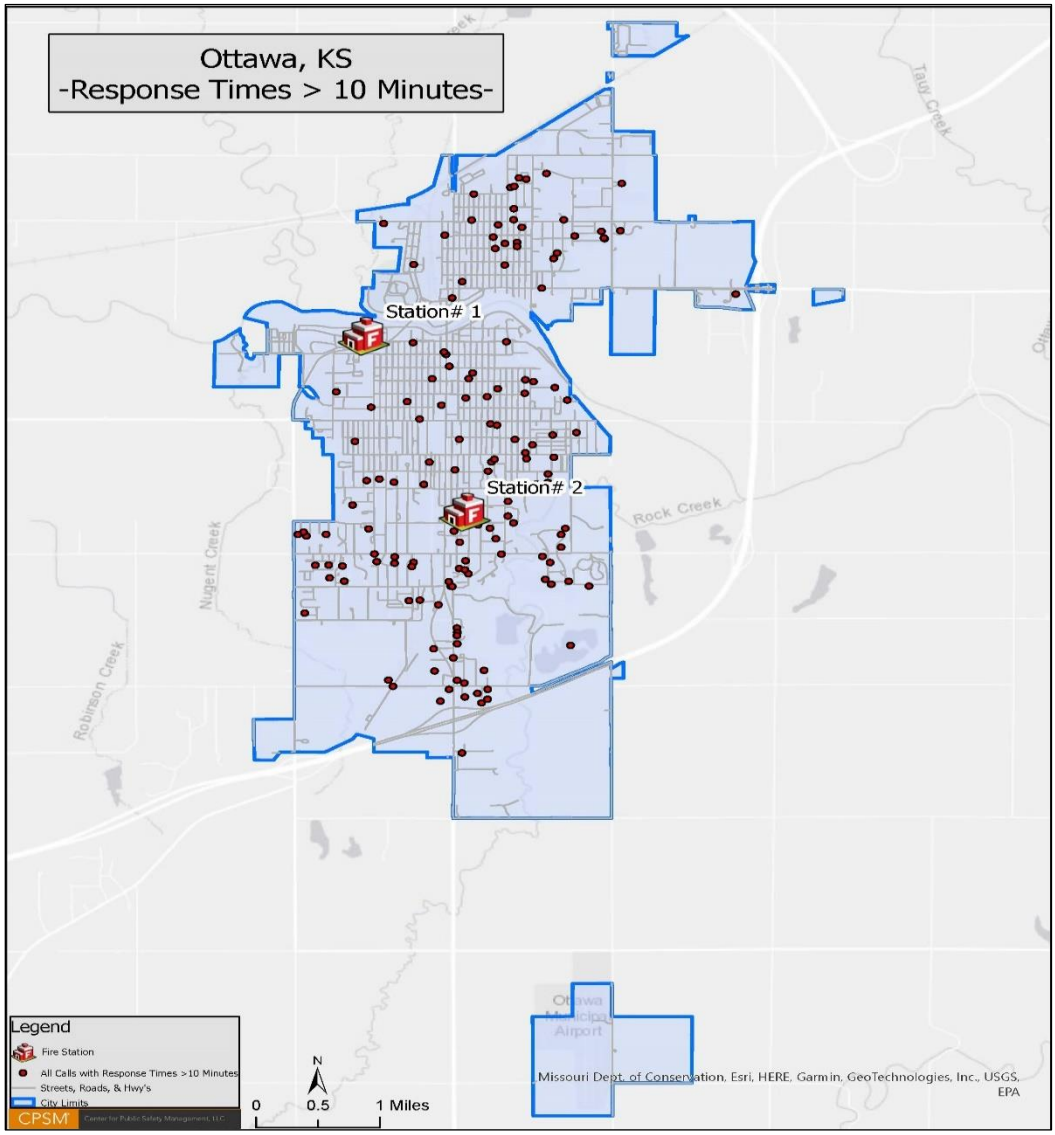
FIGURE 6-9: OFD Responses with Total Response Times of 10 Minutes or Greater



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SECTION 7. PERFORMANCE MEASUREMENT

Fire suppression, prevention programs, and EMS service delivery need to be planned and managed so that these efforts achieve specific, agreed-upon results. This requires that a set of goals be established for the activities that make up any given program. Determining how well an organization or program is doing requires that these goals be measurable and that they are measured against desired results. This is the goal of performance measurement.

Simply defined, performance measurement is the ongoing monitoring and reporting of progress toward pre-established goals. It captures data about programs, activities, and processes, and displays data in standardized ways that help communicate to service providers, customers, and other stakeholders how well the agency is performing in key areas. Many agencies in both government and business refer to performance measures as ***Key Performance Indicators or KPIs***. Measuring performance in the fire service provides a basis for determining if the current methods of deployment, the distribution of resources, and the overall effectiveness of operations are appropriately matched in meeting the service demands of the community. Performance measurement provides an organization with tools to assess performance and identify areas in need of improvement or adjustment. In short, ***what gets measured gets improved***.

The need to continually assess performance requires adding new words and definitions to the fire service lexicon. Fire administrators need to be familiar with the different tools available and the consequences of their use. In *Managing the Public Sector*, business professor Grover Starling applies the principles of performance measurement to the public sector. He writes that the consequences to be considered for any given program include:

Administrative feasibility: How difficult will it be to set up and operate the program?

Effectiveness: Does the program produce the intended effect in the specified time? Does it reach the intended target group?

Efficiency: How do the benefits compare with the costs?

Equity: Are the benefits distributed equitably with respect to region, income, gender, ethnicity, age, and so forth?

Political feasibility: Will the program attract and maintain key actors with a stake in the program area?[38]

Performance measurement systems vary significantly among different types of public agencies and programs. Some systems focus primarily on efficiency and productivity within work units, whereas others are designed to monitor outcomes produced by major public programs. Still others track the quality of services provided by an agency and the extent to which citizens are satisfied with these services.

Within the fire service, performance measures tend to focus on inputs (the amount of money and resources spent on a given program or activity) and short-term outputs (the number of fires, number of EMS calls, response times, etc.). One of the goals of any performance measurement system should also be to include efficiency and cost-effectiveness indicators, as well as explanatory information on how these measures should be interpreted. An explanation of these types of performance measures are shown in the following table.

38. Grover Starling, *Managing the Public Sector*, (Cengage Learning), 396.

TABLE 7-1: The Five GASB Performance Indicators[39]

Category	Definition
Input indicators	These are designed to report the number of resources, either financial or other (especially personnel), that have been used for a specific service or program.
Output indicators	These report the number of units produced or the services provided by a service or program.
Outcome indicators	These are designed to report the results (including quality) of the service.
Efficiency (and cost-effectiveness) indicators	These are defined as indicators that measure the cost (whether in dollars or employee hours) per unit of output or outcome.
Explanatory information	This includes a variety of information about the environment and other factors that might affect an organization's performance.

One of the most important elements of performance measurement within the fire service is to describe service delivery performance in a way that both citizens and those providing the service have the same understanding. The customer will ask, "Did I get what I expected?" the service provider will ask, "Did I provide what was expected?"

Ensuring that the answer to both questions is "yes" requires alignment of these expectations and the use of understandable terms. The author of the "Leadership" chapter of the 2012 edition of ICMA's *Managing Fire and Emergency Services* "Green Book" explains how jargon can get in the way:

> *Too often, fire service performance measures are created by internal customers and laden with jargon that external customers do not understand. For example, the traditional fire service has a difficult time getting the public to understand the implications of the "time temperature curve" or the value of particular levels of staffing in the suppression of fires. Fire and emergency service providers need to be able to describe performance in a way that is clear to customers, both internal and external. In the end, simpler descriptions are usually better.*[40]

The OFD does not utilize performance measures in tracking operational, administrative, prevention, or training activities within the department. Though OFD keeps records of select activities, these indices are not utilized in the regular review and reporting of department activities. It is critical that OFD develop a series of internal reporting processes that provide a direct link to department goals or specific target measures. It is also critical that these measures be both quantitative and qualitative in nature and reflect on multiple areas of service delivery within the organization. This type of ongoing analysis and the monitoring of trends are most useful to justify program budgets and to measure service delivery levels.

Staff throughout the organization should participate in the development of any measures. In addition to helping facilitate department wide buy-in, this could provide an opportunity for

39. From Harry P. Hatry et al., eds. *Service Efforts and Accomplishments Reporting: Its Time Has Come* (Norwalk, CT: GASB, 1990).
40. I. David Daniels, "Leading and Managing," in Managing Fire and Emergency Services (ICMA: Washington, DC: 2012), 202.

upper management to better understand what the line staff believes to be critical goals—and vice versa. For the same reason, the process of developing performance measures should include citizen input, specifically with regard to service level preferences. Translating this advice from the citizens into performance measures will link the citizens and business community to the department, and will identify clearly if the public's expectations are being met.

> ***Recommendation: OFD should implement a series of performance measures that enable ongoing review of service outcomes. The process of developing these measures should utilize input from OFD members, the community, the City Commission, and City Administration. (Recommendation No. 19.)***

Following are a number of performance measures that may be considered:

Operations:

- Response times (fire and percentile/average/frequency of excessive times).
  - Alarm/dispatch handling times.
  - Turnout times.
  - Travel times.
  - On-scene time.
  - Call duration.
  - Canceled en route.
- Workload measures
  - Emergency vs. nonemergency responses.
  - Number and frequency of EMS transports—ALS/BLS.
  - Response to automatic fire alarms/frequency and outcomes.
  - Company inspections/area occupancy familiarization.
  - Fire preplanning.
  - Public education: contact hours/numbers by age group.
- Outcome measures
  - EMS/save rates/action taken.
  - Successful IVs and Intubations.
  - EMS protocol compliance.
  - Fire loss/limit of fire spread—point of origin, room of origin, etc.
  - On-duty injuries/worker's comp claims.
  - Lost time—sick/injury.
  - Vehicle accidents.
  - Equipment lost or broken.

Training:

- Fire and EMS hours.
- Officer development.
- Skills assessment compliance.
- Specialty training.
- Professional development/formal education/certifications.
- Fitness performance.

Prevention:

- Plans review (numbers/valuation amount/completion time).
- Inspections (new and existing).
  - Numbers.
  - Completion time.
  - Violations (found/corrected).
  - Quantification by type of violation and occupancy type.
- Fire investigations
  - Numbers and determinations.
  - Occupancy types, time of occurrence, ignition source.
  - Fire loss/structure and contents.
  - Arson arrests/convictions.
  - Fire deaths (demographics/occupancy type/cause and origin).

Miscellaneous:

- Customer service surveys (by engine/by shift).
  - Following emergency response.
  - Public assist.
  - Inspections (prevention and company).
  - Public education.
  - In-service training (employee assessments).
- Financial/budgetary.
  - Overtime expenditures and cause.
  - Apparatus repair costs and out-of-service time.

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SECTION 8. ESSENTIAL RESOURCES

FIRE PREVENTION AND CODE ENFORCEMENT

Ensuring that services are delivered effectively is paramount in any fire service organizational mission. The functions of the fire marshal and fire prevention are most critical in that organizational milieu. The foundation of a good risk management program is to prevent fires before they occur and reduce the losses from those that do occur.

The fire departments that are most effective in reducing losses are those that have successfully integrated prevention as a core value throughout the organization and continuously review the impact of prevention on the overall services provided by the department. There are basic approaches that can be used to ensure that prevention is treated as a paramount department-wide priority. One way to accomplish this is to have that core value of an organization referenced directly in the mission statement.

In Ottawa the Assistant Fire Chief serves as the city's Fire Marshal and is responsible for fire prevention code enforcement, plans review, public safety education, and cause and origin investigation services. The city has a robust ***in-service engine company fire inspection program***. More than 600 fire inspections are conducted annually at local business, manufacturing facilities, multifamily residential structures, hotels, motels, medical facilities, assisted living centers, and schools through this process. CPSM recognizes the OFD in-service fire inspection program as a ***Best Practice.***

The City of Ottawa has adopted the 2018 International Fire Code (IFC) and the International Building Code. The Fire Department is responsible for plan reviews, fire inspections, and public fire education. The Fire Department works closely with the city's Building Department in carrying out its inspection duties. The permitting process, inspection scheduling, and all fees are collected through the Building Department. The Fire Department does not receive any revenue from its inspection, plans review, and permitting services.

The Ottawa Fire Department does not keep on-going records regarding is Fire Prevention Activities. The in-service fire inspection program was put into abeyance in 2023 because of a change in the city's data processing system and records entry had not been initiated at the time of our study. Because the fire department activities were also being maintained in the Building Department's recordkeeping system, Fire Department Officials were unable to provide any account regarding the various inspection, plans review, and special permitting activities that had been done. CPSM believes that the OFD should be generating regular reporting (monthly or quarterly) regarding all of the fire prevention functions being done.

> ***Recommendation: OFD should implement an internal recordkeeping process for all fire prevention activities including fire inspections, plans review, special permitting, public education, and fire investigations. (Recommendation No. 20.)***

CPSM estimates that the fire prevention costs incurred by the Fire Department in providing these services are approaching $200,000 annually. The majority of these services are provided to business, manufacturing, institutions, health care, and processing entities. Many fire agencies have moved to, or are moving to full cost recovery for its fire prevention services. These costs are passed on as development charges or as ongoing business expenses. OFD is not recovering any of its inspections or plans review costs. We believe that there should be a direct off-set for the fire

inspections services and fees generated through the permitting process. The city should attempt to achieve the full cost recovery for fire prevention and permitting services.

> ***Recommendation: The City of Ottawa should implement fire plans review, inspection, and permitting fees in order to recover the full cost of providing these services in the community. (Recommendation No. 21.)***

Some of the costs associated with fire prevention activities (public education, fire investigations, etc.) are generally costs that are not charged for and are provided from municipal taxation. However, these costs make up a small percentage of the OFD fire prevention expenditures.

Fire Investigations

Fire investigations are conducted by five OFD line personnel who have received specialized training in this discipline. These investigators are assigned to the various shifts and have assumed the responsibility to conduct fire investigations when a fire occurs on their respective shifts. This effort is coordinated by the Fire Marshal and when needed the State Fire Marshal's office will be called in on those more complex investigations involving suspected arson or when there is a fire death.

ISO RATING

The ISO collects data for more than 48,000 communities and fire districts throughout the country. This information is analyzed using a proprietary Fire Suppression Rating Schedule (FSRS). This analysis is then tabulated in generating a Public Protection Classification (PPC). The PPC classifications range between 1 and 10, with Class 1 representing "superior property fire protection" and Class 10 indicating that an area does not meet the minimum criteria set by the ISO. In 2013, the revised FSRS was released; it adds an emphasis on a community's effort to limit loss before an incident occurs (fire prevention).

Since the 1800s, insurance companies have been involved in one way or another in "rating" fire departments. As cities grew and buildings became larger and communities more industrialized, insurance companies sometimes incurred large losses from fires. Much of the time, these losses were due to inadequate water supplies and ineffective fire suppression capabilities. To help reduce losses, insurance companies developed criteria to evaluate community fire suppression capabilities and to quantify the level of fire services provided. Once quantified, insurance companies used the information (rating) to determine and assign fire insurance rates. The emphasis then, as now, was primarily to reduce dollar loss from fires. Though improving water supplies and fire suppression can and does improve life safety, the purpose of rating fire departments is to adjust insurance rates to lessen insurance company losses.

ISO uses data and information provided by each community to derive a Public Protection Classification (PPC). Community evaluations are performed periodically or when there is reason to believe there may be a change in the PPC. As it is intended, the PPC is only used to assess a community's fire protection—it does not consider other emergencies or important services provided by the fire department such as EMS, wildfire mitigation, technical rescue, or hazmat incident response. The ISO acknowledges the use of the PPC is limited to assessing *fire*

suppression capabilities and that fire departments do many more things to improve public safety.[41]

In developing a PPC, the following major categories are evaluated:

- Emergency Communications: Fire alarm and communication systems, including telephone systems, telephone lines, staffing, and dispatching systems.
- Fire Department: The fire department, including equipment, staffing, training, and geographic distribution of fire companies.
- Water Supply: The water supply system, including the condition and maintenance of hydrants and the amount of available water compared to the amount needed to suppress fires.
- Fire Prevention: Programs that contain plan review; certificate of occupancy inspections; compliance follow-up; inspection of fire protection equipment; and fire prevention regulations related to fire lanes on area roads, hazardous material routes, fireworks, barbecue grills, and wildland-urban interface areas.
- Public Fire Safety Education Programs: Fire safety education training and programs for schools, private homes, and buildings with large loss potential or hazardous conditions, and a juvenile fire-setter intervention program.

Ottawa received an ISO Class 3/3X rating in 2016. The city's score was 77.58, which is at the upper end of the Class 3 rating (70.0 to 79.9). Ottawa received a ***split-rating of 3/3X***. A split rating is applied to those communities that have service areas in which properties are beyond 1,000 feet from a creditable water supply (typically a fire hydrant) or more than five miles from a fire station. Ottawa scored exceptionally well in most areas of the evaluation. CPSM recognizes the city's achievement as a Class 3/3X ISO rating as a ***Best Practice***. Nationwide in 2015, only 1,342 communities of the more than 48,000 communities rated, received a higher rating than Ottawa. The Ottawa rating places the community in the top 10 percent of those ratings in 2016.

It is also important to note that OFD received good scoring in the areas of fire training, receiving 8.27 points out of 9. The water utility system was scored at 38.11 out of a possible 40. Ottawa was short by only 2.42 points in achieving a Class 2 Rating. Four areas in which these points can be achieved are as follows:

- Emergency Communications: Credit for Telecommunicators ……..…..1.6 Points Available
- Emergency Communications: Credit for Dispatch Circuits ,,,,,,,,,……... 1.2 Points Available
- Water Supply: Credit for Hydrant Testing ……..……1.4 Points Available
- Fire Department: Credit for Company Personnel ……..……..9.8 Points Available

If the proposed change in Kelly Days is made and the recommended personnel are added as suggested previously in this report, CPSM believes that the majority of the 2.42 points needed to obtain a Class 2 rating can be satisfied. If additional points are needed beyond those awarded for the Company Personne (571), the next recommended and least costly option would be in the area of improvements in Hydrant Inspection and Flow Testing (631).

41. Flippin, P., Gaull E., Laun, J., Flicko, R., District of Columbia Fire and Emergency Medical Services Fleet Management Audit and Assessment (District of Columbia Fire and Emergency Medical Services, Washington, DC 2013).

EDUCATION AND TRAINING PROGRAMS

Training is one of the most important functions that a fire department should be performing on a regular basis. One could even make the argument that training is, in some ways, more important than emergency response, because a department that is not well-trained, prepared, and operationally ready will be unable to effectively and safely fulfill its emergency response obligations. A comprehensive and ongoing training program is absolutely critical to the fire department's level of success.

An effective fire department training program must cover all of the essential elements of that department's core missions and responsibilities. The program must include an appropriate combination of technical/classroom training, manipulative or hands-on/practical evolutions, and training assessment to gauge the effectiveness of these efforts. Most of the training, but particularly the practical, hands-on training evolutions, should be developed based upon the department's own operating procedures while remaining cognizant of widely accepted practices and standards.

Certain Occupational Safety and Health Administration (OSHA) regulations dictate that minimum training covering various topics must be completed on an annual basis. This training covers:

- A review of the respiratory protection standard, self-contained breathing apparatus (SCBA) refresher and user competency training, SCBA fit testing (29 CFR 1910.134).
- Blood Borne Pathogens Training (29 CFR 1910.1030).
- Hazardous Materials Training (29 CFR 1910.120).
- Confined Space Training (29 CFR 1910.146).
- Structural Firefighting Training (29 CFR 1910.156).

Education and training programs help to create the character of a fire service organization. Agencies that place a real emphasis on their training have a tendency to be more proficient in carrying out day-to-day duties. The prioritization of training also fosters an image of professionalism and instills pride in the organization.

The training functions of the OFD are coordinated by the department's three station Lieutenants with oversight from the Fire Chief and Assistant Chief. Station officers (Captains and Lieutenants) are assigned the responsibility for ensuring that personnel under their supervision receive the requisite training and assuring that the required level of competency is achieved.

Firefighter Recruit Training

Fire service agencies have traditionally trained new firefighters in-house utilizing the NFPA guidelines. It is very common for smaller agencies, particularly those with a limited number of position openings (including Ottawa), to utilize an on-the-job training process and task-book progression to train and qualify new employees or members for various assignments.

OFD currently requires all new firefighter applicants to have, as a pre-requisite for hiring, certifications for both Firefighter-1 and EMT. Once hired, Firefighter-II certification is a pre-requisite for promotion to Driver Engineer and beyond. This approach for the hiring of new personnel is very cost-effective in that it eliminates the need to conduct a multiweek training academy and allows OFD to bring new employees into line positions more rapidly. CPSM recognizes the OFD new employee hiring prerequisites as a ***Best Practice***.

In-Service Fire & EMS Training

Under the supervision of the station Lieutenants, the department produces an annual training plan that prescribes the training topics to be delivered, the specified hours allocated into the various subjects, and the source materials utilized for instruction. We found the content and quality of the ***OFD Annual Training Plan*** to be comprehensive, organized, and well-thought-out. CPSM recognizes the OFD training system as a ***Best Practice***.

EMS training is coordinated through Franklin County EMS. Because of the co-location of Franklin County EMS and OFD, the ability to jointly train and to utilize consistent instruction and individual assessments are easily facilitated. EMS training requirements are much more structured than fire training and specific recertification continuing education requirements are specified along with associated skills assessments. The OFD and Franklin County EMS training regimen is extremely effective in maintain the levels of competency that are required

Many agencies utilize a ***Task Book*** process to evaluate a candidate's performance of skills or work experiences that are required for either the new firefighter probationary period or for those minimum tasks needed for those employees to demonstrate competencies in those tasks required for promotion into various positions. The task book is organized in a logical progressing of skills and competencies needed for a respective position. It serves as a guide for the employee and the evaluating supervisor to document that a specific competency of the position was demonstrated successfully. There is a sign-off process by the supervisor witnessing the performance. The task book typically follows an orderly progression that moves from the simpler skill to the more complex. The cumulative completion of all tasks, sometimes by different supervisors, then allows the new employee to complete their probation or in a promotion requirement, allows the employee to qualify to compete in the promotional testing process. Completing a Task book allows the employee to progress at their own pace, although a Task Book typically has a maximum time for being completed. Usually, the Task Book is not the only tool utilized in the consideration of an employee's progression, but serves as a component in the process and provides documentation regarding the achievement of the necessary skills or experience required of the position. OFD utilizes the Task Book process for probationary firefighters and should expand its use in its promotional processes.

> ***Recommendation: The Ottawa Fire Department should expand the utilization of the Task Book process in the demonstration of needed competencies or experience to qualify for promotional opportunities. (Recommendation No. 22.)***

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Skills Assessment

As stated above, OFD develops and distributes a very detailed and comprehensive training plan that provides guidance to the individual company officers regarding daily and monthly training activities. This plan specifies the number of fire training hours to be completed annually for its line employees; these criteria are in accordance with NFPA, OSHA and ISO guidelines. Departmental training specifies a number of sources to obtain the necessary instructions including online or interactive video formats, reading materials, classroom instruction, and practical field evolutions.

CPSM believes it is essential that every training program ensure consistency in the competencies achieved by employees so they may perform those tasks needed to operate successfully in emergency settings.

Unlike the EMS training curriculum which requires skills assessment in order to obtain the necessary continuing education credits, fire and other related service training typically does not include skills assessment and recorded test scores to determine individual proficiency. CPSM believes that the OFD should institute a skills assessment process as part of its annual training plan and a uniform standard that ensures individual proficiencies.

> ***Recommendation: The Ottawa Fire Department should institute written and practical skills testing as part of the department's annual fire training plan. (Recommendation No. 23.)***

The monitoring and recording of training test scores are beneficial in ensuring overall proficiency while providing an objective assessment that can be incorporated into the annual performance appraisal process. In addition, the concept of adding a testing process to each training evolution adds to the importance, consistency, and seriousness with which these activities are carried out.

Physical Fitness Evaluation

Employee physical fitness is necessary for fire and EMS personnel to do their jobs effectively while avoiding injuries. NFPA 1583, *Standard on Health-Related Fitness Programs for Fire Department Members*, is a recognized industry standard for monitoring and maintaining firefighter fitness. OFD maintains a rigid fitness standard for its emergency response personnel. Employees are required to either maintain an annual physical fitness regimen or complete the ***Candidate Physical Ability Test (CPAT)***. OFD personnel who participate in out-of-area wildland assignments are also required to successfully complete the ***Pack Test-Work Capacity Testing for Wildland Fire Fighting*** as an annual fitness qualification. CPSM recognizes the OFD fitness requirements for its line employees to be a ***Best Practice***.

Annual Medical Evaluations

Closely aligned with the need for firefighter fitness assessment is the need for firefighters to have an annual medical evaluation to ensure employee well-being and health status so they can safely perform their duties.

Firefighters are susceptible to developing hypertension, diabetes, high cholesterol, and obesity. According to the NFPA, 43 percent of firefighter deaths are caused by overexertion and stress. In 2017, the Firefighter Cancer Support Network revealed that 61 percent of career firefighter line-of-duty deaths occurred as a result of cancer from 2002 to 2017. Periodic and directed medical testing and screening are vital to the well-being of firefighters and are effective in identifying problems at early stages in order to facilitate treatment. ***NFPA 1582, Standard on Comprehensive Occupational Medical Program for Fire Departments***, outlines an occupational medical program for firefighters aimed at reducing health risks and provides guidance for periodic screening and medical evaluations. The following medical testing is recommended under the provisions of NFPA 1582:

- Blood analysis.
- Urinalysis.
- Pulmonary function test.
- Chest X-ray (every five years).
- EKG.

- Infectious disease screening.
- Cancer screening.
- Audiometric exam.
- Vision testing.

Ottawa conducts an annual medical evaluation for its firefighters. CPSM recognizes this as a ***Best Practice***.

EMERGENCY MANAGEMENT

Emergency management is the discipline and profession of applying science, technology, planning, and management to deal with extreme events that can injure or kill large numbers of people, do extensive damage to property, and disrupt community life. When such events occur and cause extensive harm, they are called disasters.[42]

Franklin County and the City of Ottawa have jointly created the Franklin County Emergency Operations Plan (CEOP). The CEOP is an integrated plan based on the National Incident Management System; it provides an all-hazards approach in managing larger emergency incidents. The plan outlines a concept for emergency operations, assigns roles and responsibilities, and prescribes management and procedures for the Emergency Operations Center. Franklin County has a total area of nearly 577 square miles and a population in 2020 estimated at 26,000, with Ottawa being the County Seat and the largest municipality in the county.

The CEOP provides emergency management coordination, planning, and training activities through a cooperative effort. This plan is issued in accordance with the Kansas Response Plan (KRP), the Robert T. Stafford Disaster Relief Act, and Chapter 48, Article 9 of the Kansas Statutes, which establishes the authority for jurisdictions to guide their operations during a major disaster. The agreement specifies a scope of services that include the maintenance of the adopted County Emergency Operations Plan, the staffing of the Franklin County Emergency Operations Center, yearly exercises and training, coordination with public and private agencies, and regular reporting to the County Commission

The CEOP is a usable and thorough document but was last updated and distributed in 2013. Work was underway to revise the existing EOP but was not completed at the time of this review. Typically, it is recommended that EOP's be updated every five years. The Franklin County EOP was written 10 years ago and should be updated.

> ***Recommendation: The City of Ottawa should work with Franklin County Emergency Management to update of the County Emergency Operations Plan (CEOP). (Recommendation No. 24.)***

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The Emergency Operations Center (EOC) provides a very viable forum from which the coordination for a single-agency or joint operations event can be executed. The CEOP, though dated, is designed to work in cooperation with federal, state, and local governments. It provides

42. *Emergency Management: Principles and Practice for Local Government*. Eds. Thomas E. Drabek, Gerard J. Hoetmer. International City Management Association, 1991. p. xvii

guidance for the development, implementation, and sustainment of Kansas's emergency management and coordination efforts.

The EOP is organized to address the following:

- Organization and Assignment of Responsibilities.
- Administration and Logistics.
- Plan Development and Maintenance.
- Transportation.
- Communications.
- Public Works and Engineering.
- Firefighting.
- Emergency Management.
- Mass Care, Emergency Assistance, Housing and Human Services.
- Logistics Management and Resource Support.
- Public Health and Medical Services.
- Search and Rescue.
- Oil and Hazardous Material Response.
- Agricultural and Natural Resources.
- Energy.
- Public Safety and Security.
- Long-Term Community Recovery.
- External Affairs.
- Debris Management.
- Mass Fatalities Management.

While the Franklin County CEOP and its coordination with the City of Ottawa is well-designed and comprehensive in its organization, there appears to be an unrealistic reliance on the limited capacity of the county's DES resources. Many of the functional duties are assigned to the county's DES staff, which in reality is a single person. In addition, some key organizational resources are not included in the planning process and the design of its operations. The Ottawa School District 290, Ottawa University, BNSF Railroad, and Ottawa Police and Fire, are just some of the key community organizations and agencies that have not been identified in the planning process nor have they been assigned to key support functions in the plan of operations. In addition, the public information process and the establishment of a viable and sufficient ***Public Call Center*** has not been fully planned and established as a key responsibility of the emergency planning effort.

> ***Recommendation: The City of Ottawa should initiate an effort with Franklin County Emergency Management to establish a joint County-City Emergency Management Leadership Team to support planning and operational***

assignments in the emergency management process. (Recommendation No. 25.)

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Since the City of Ottawa is the largest population and commercial center in Franklin County, it should assume a larger role in the planning efforts and should maintain key representatives in the emergency management process from within the organization. CPSM believes that the City of Ottawa should have a designated City Emergency Manager who is assigned from either Fire, Police, or the City Manager's Office and who would be responsible for emergency planning and coordination, with Franklin County EM. It is also our recommendation that the City's Emergency Manager serve as the Alternate County Emergency Manager and be assigned key functional duties when the county EOC is activated.

Recommendation: The City of Ottawa should designate a City Emergency Manager from a key department (Police, Fire, or the City Manager's Office), who is responsible for implementing the city's emergency planning and coordination efforts in cooperation with Franklin County. (Recommendation No. 26.)

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The City of Ottawa has not developed a municipal continuity of operations plan (COOP). It is vital that each department within the city develop a detailed plan for the continuity of its specific operations, the succession of leadership, and the preservation of records.

Recommendation: The City of Ottawa should initiate an effort in which every city department develops and exercises a Continuity of Operations Plan (COOP). (Recommendation No. 27.)

A Continuity of Operations Plan details how a particular agency will continue to operate under adverse conditions including under circumstances where its primary operating locations are no longer functional or the normal staffing levels have been reduced so that an altered service model is required. FEMA provides a very functional guide in developing agency-specific COOP planning documents. (See: http://www.fema.gov/pdf/about/org/ncp/coop/continuity_plan_federal_d_a.pdf). The Butte / Silver Bow County COOP document could serve as a model for this planning document.[43]

EMERGENCY COMMUNICATIONS CENTER (911)

The Franklin County Emergency Communications Center provides 911 emergency communications for the Ottawa Fire Department and is responsible for the dispatching and radio communications throughout the City of Ottawa and Franklin County. The Center is operated under the direction of the County's Director of Emergency Communication and is an independent county agency providing dispatching services for the following Franklin County Agencies:

- Franklin County Sherriff's Office.
- Franklin County EMS.

43. https://www.co.silverbow.mt.us/DocumentCenter/View/4842/Annex--COOP?bidId=

- Ottawa Police Department.
- Wellsville Police Department.
- Ottawa Fire Department.
- Kansas Highway Patrol.
- Kansas Wildlife and Parks.
- 8 Rural Franklin County Fire Departments.

The 911 Center Director is very knowledgeable in the field of public safety communications and understands the advantages and challenges of the next generation of 911 (NextGen911) in the U.S. She has surrounded herself with a staff that are highly capable and efficient in managing emergency communications and who have a long working history in the unit.

The Center is staffed 24 hours a day, seven days a week, with a minimum staffing of two personnel. During peak periods (9:00 a.m. to 9:00 p.m.) the Center's staffing will increase to three positions. During major incidents, it is common practice for additional personnel to be brought in to assist. A dispatcher will be assigned specifically to any larger incident. All dispatchers are cross-trained and can take up any position in the Center, be it fire, law enforcement, or as a telephone call taker. Initial training for dispatchers includes five months of combined classroom and supervised positional training for the various dispatch assignments (call taker, police, and fire). All dispatch personnel are EMD certified and complete CPR training.

All voice and radio transmissions are recorded. The Center uses a Phase II triangulation system to identify the location of cell phone calls that are received. All critical dispatch equipment is on an uninterrupted power supply (UPS). The Center is fully backed up with an auxiliary generator that is tested monthly; however, ***an alternative site has not been established, in the event of a major outage or an inability to operate from this key facility.***

Emergency Medical Dispatching (EMD) is being done at the Ottawa Center. EMS-related calls are screened to determine their severity and then an altered response can be implemented depending on this determination. Even though the Center is screening calls to determine the appropriate level of response, OFD units are responding with lights and sirens regardless of this call screening determination. As recommended earlier in this report, CPSM believes that OFD should be modifying its response when it is determined that the call is non-emergency.

The Franklin County Emergency Communication Center was found to be well managed and highly proficient in managing a significant workload. In 2020, the Center handled nearly 49,000 911 requests and more than 105,000 total telephone calls. The Center is responsible for receiving non-emergency administrative calls for many of the agencies served. As indicated in an earlier section of this report, there are opportunities to improve the city's ISO rating by making improvements at the Center. CPSM believes that the city should explore opportunities to improve the staffing levels and dispatch circuitry at the Center.

Recommendation: The City of Ottawa should explore its options to provide supplemental funding to the Franklin County Emergency Communications Center in order to improve staffing levels and the number of dispatch circuits as identified in the city's most recent ISO review. (Recommendation No. 28.)

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SECTION 9. DATA ANALYSIS

This data analysis examines all calls for service between January 1, 2022, and December 31, 2022, as recorded in the Franklin County 9-1-1 Communications Center's computer-aided dispatch (CAD) system and OFD's National Fire Incident Reporting System (NFIRS).

This analysis is made up of four parts. The first part focuses on call types and dispatches. The second part explores the time spent and the workload of individual units. The third part presents an analysis of the busiest hours in the year studied. The fourth and final part provides a response time analysis of OFD units.

The Ottawa Fire Department serves a population of about 12,600 people in an area of approximately 10.4 square miles. OFD is an all-hazards response fire department, providing service and protection for fire, hazardous material responses, vehicle accidents, and other incidents where life and property are threatened. The OFD staffs 21 full-time and four volunteer firefighters. It operates out of two fire stations, utilizing two frontline engines, a reserve engine, a brush truck, a squad, a tower, a utility unit, three air units, and two administrative vehicles.

Between January 1, 2022, and December 31, 2022, the Ottawa Fire Department responded to 2,055 calls, of which 65 percent were EMS calls. The total combined workload (deployed time) for OFD units was 777.7 hours. The average dispatch time was 1.5 minutes, and the average total response time was 7.7 minutes. The 90th percentile dispatch time was 2.4 minutes and the 90th percentile total response time was 10.6 minutes.

METHODOLOGY

In this report, CPSM analyzes calls and runs. A call is an emergency service request or incident. A run is a dispatch of a unit (i.e., a unit responding to a call). Thus, a call may include multiple runs.

We received CAD data and NFIRS data for the Ottawa Fire Department. We first matched the NFIRS and CAD data based on the incident numbers provided. Then, we used the NFIRS incident type to identify canceled calls and to assign emergency medical service (EMS), motor vehicle accident (MVA), and fire category call types. For calls without NFIRS incident types, we instead categorized them based on the call type description field in the CAD data. The method of call type categorization is shown in Attachment IV. Calls that occurred outside OFD's fire district were identified as aid given (including both automatic aid and mutual aid).

We received records for 2,309 total calls that were made between January 1, 2022, and December 31, 2022. We removed two information calls, 45 radio pager calls, and three test calls. We also removed 193 calls to which a unit was dispatched but did not go en route or arrive on scene. Eleven calls that involved only administrative units were not included in the main analysis. The work associated with these calls is included in the analysis of additional personnel in Attachment I.

AGGREGATE CALL TOTALS

Between January 1, 2022, and December 31, 2022, OFD responded to 2,055 calls, of which 29 were structure fire calls and 29 were outside fire calls.

Calls by Type

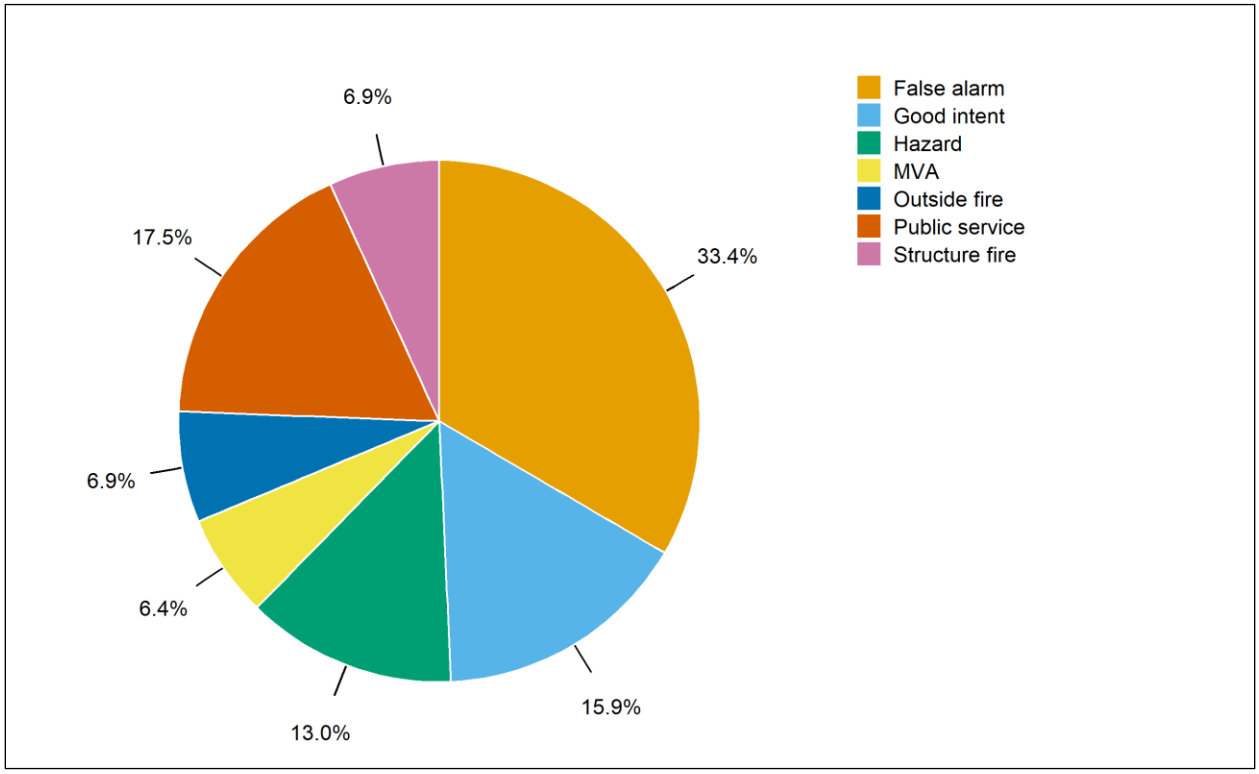
The following table shows the number of calls by call type, average calls per day, and the percentage of calls that fall into each call type category for the 12 months studied. The subsequent figure shows the percentage of each category of fire calls.

TABLE 9-1: Call Types

Call Type	Total Calls	Calls per Day	Call Percentage
False alarm	141	0.4	6.9
Good intent	67	0.2	3.3
Hazard	55	0.2	2.7
MVA	27	0.1	1.3
Outside fire	29	0.1	1.4
Public service	74	0.2	3.6
Structure fire	29	0.1	1.4
Fire Subtotal	**422**	**1.2**	**20.5**
EMS	**1,341**	**3.7**	**65.3**
Aid given*	76	0.2	3.7
Canceled	216	0.6	10.5
Total	**2,055**	**5.6**	**100.0**

Note: *Calls that occurred outside OFD's fire district were labeled as aid given. Out of 76 aid given calls, 18 were canceled.

FIGURE 9-1: Fire Calls by Type



Observations:

Overall

- The department received an average of 5.6 calls per day, including 0.6 canceled and 0.2 aid given calls.

EMS

- EMS calls for the year totaled 1,341 (65 percent of all calls), an average of 3.7 per day.

Fire

- Fire calls for the year totaled 422 (21 percent of all calls), an average of 1.2 per day.
- False alarm calls made up 33 percent of fire calls, an average of 0.4 calls per day.
- Structure and outside fire calls combined made up 14 percent of fire calls, an average of 0.2 calls per day, or one call every six days.

Calls by Type and Duration

The following table shows the duration of calls by type using four duration categories: less than 30 minutes, 30 minutes to one hour, one to two hours, and more than two hours.

TABLE 9-2: Calls by Type and Duration

Call Type	Less than 30 Minutes	30 Minutes to One Hour	One to Two Hours	Two or More Hours	Total
False alarm	125	12	3	1	141
Good intent	61	6	0	0	67
Hazard	32	12	11	0	55
MVA	15	11	1	0	27
Outside fire	20	8	1	0	29
Public service	58	10	4	2	74
Structure fire	13	7	6	3	29
Fire Subtotal	**324**	**66**	**26**	**6**	**422**
EMS	**1,235**	**95**	**10**	**1**	**1,341**
Aid given	53	9	8	6	76
Canceled	215	1	0	0	216
Total	**1,827**	**171**	**44**	**13**	**2,055**

Observations:

EMS

- A total of 1,330 EMS calls (99 percent) lasted less than one hour, and 11 EMS calls (one percent) lasted one or more hours.

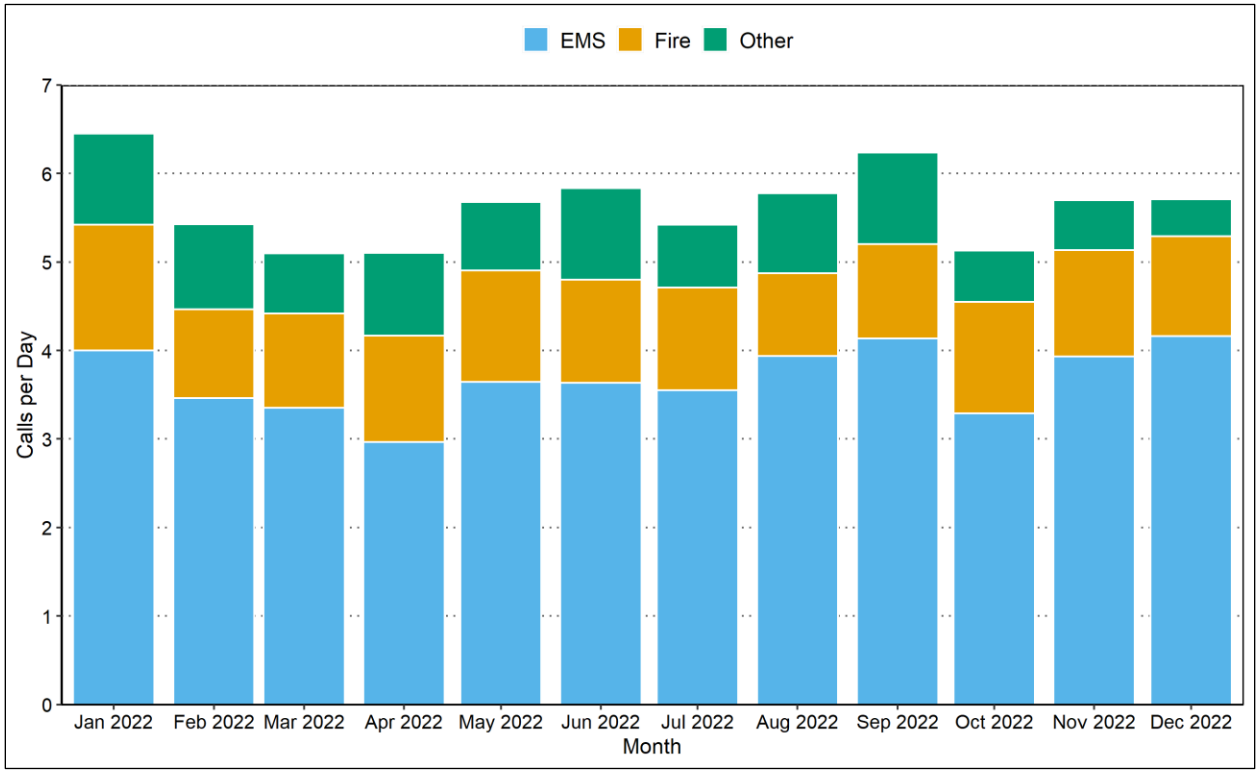
Fire

- A total of 390 fire calls (92 percent) lasted less than one hour, 26 fire calls (six percent) lasted one to two hours, and six fire calls (one percent) lasted two or more hours.
- A total of 28 outside fire calls (97 percent) lasted less than one hour and one outside fire call (three percent) lasted one to two hours.
- A total of 20 structure fire calls (69 percent) lasted less than one hour, six structure fire calls (21 percent) lasted one to two hours, and three structure fire calls (10 percent) lasted two or more hours.

Calls by Month and Hour of Day

Figure 9-2 shows the monthly variation in the average daily number of calls handled by OFD between January 1, 2022, and December 31, 2022. Similarly, Figure 9-3 illustrates the average number of calls received each hour of the day over the year.

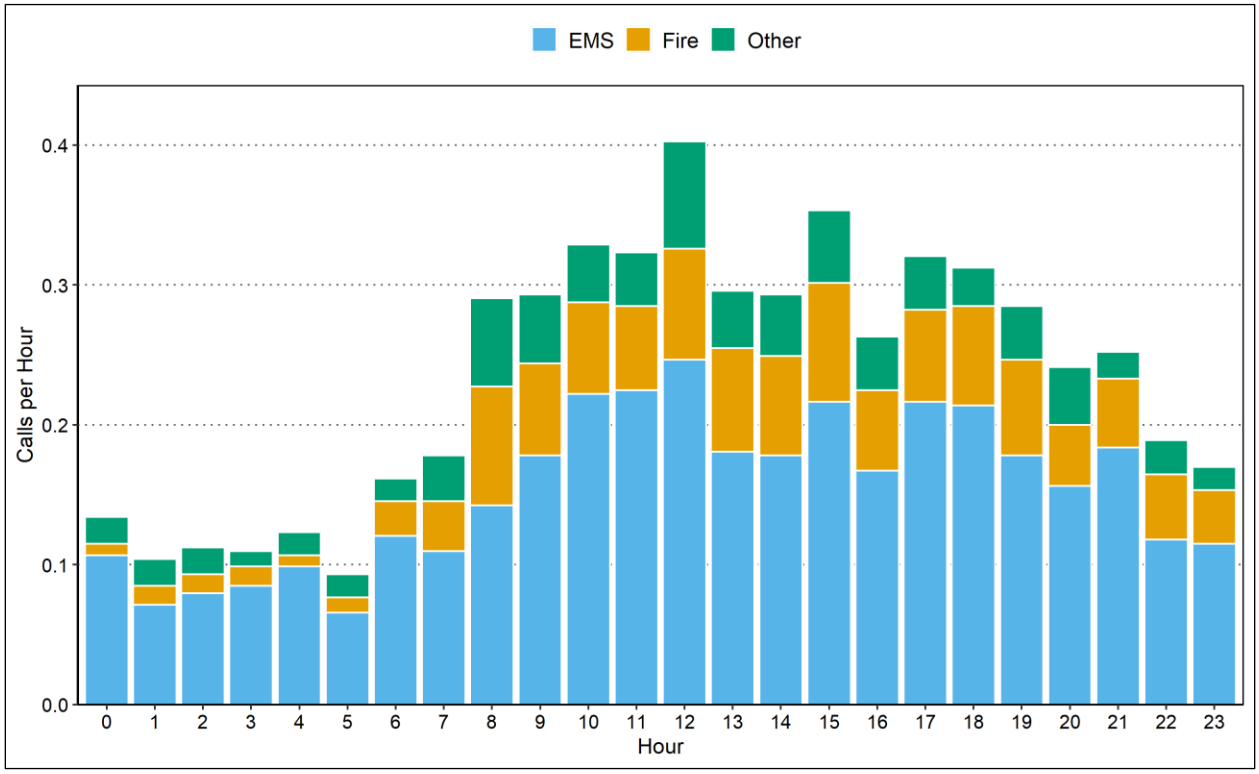
FIGURE 9-2: Calls by Month



Observations:

- Average EMS calls per day ranged from 3.0 in April to 4.2 in December.
- Average fire calls per day ranged from 0.9 in August to 1.4 in January.
- Average calls per day overall ranged from 5.1 in March to 6.5 in January.

FIGURE 9-3: Calls by Hour of Day



Observations:

- Average EMS calls per hour ranged from 0.07 between 5:00 a.m. and 6:00 a.m. to 0.25 between noon and 1:00 p.m.
- Average fire calls per hour ranged from 0.01 between midnight and 1:00 a.m. to 0.08 between 8:00 a.m. and 9:00 a.m.
- Average calls per hour overall ranged from 0.09 between 5:00 a.m. and 6:00 a.m. to 0.40 between noon and 1:00 p.m.

Units Arrived at Calls

Table 9-3, along with Figures 9-4 and 9-5, details the number of calls with one, two, and three or more OFD units arriving at a call, broken down by call type. In this section, we limit ourselves to calls where an OFD unit arrives.

TABLE 9-3: Calls by Call Type and Number of Arriving Units

Call Type	Number of Units			Total Calls
	One	Two	Three or More	
False alarm	44	87	7	138
Good intent	44	18	4	66
Hazard	23	30	2	55
MVA	14	12	1	27
Outside fire	6	18	5	29
Public service	55	17	1	73
Structure fire	3	19	7	29
Fire Subtotal	**189**	**201**	**27**	**417**
EMS	**1,306**	**26**	**0**	**1,332**
Aid given	47	4	2	53
Canceled	33	6	0	39
Total	**1,575**	**237**	**29**	**1,841**
Percentage	**85.6**	**12.9**	**1.6**	**100.0**

Note: Only calls with arriving OFD units were considered. There were 214 calls where an OFD unit recorded an en route time but no unit recorded an arrival time. This included 177 canceled calls, 23 aid given calls, nine EMS calls, and five fire calls.

FIGURE 9-4: Calls by Number of Units Arriving, EMS

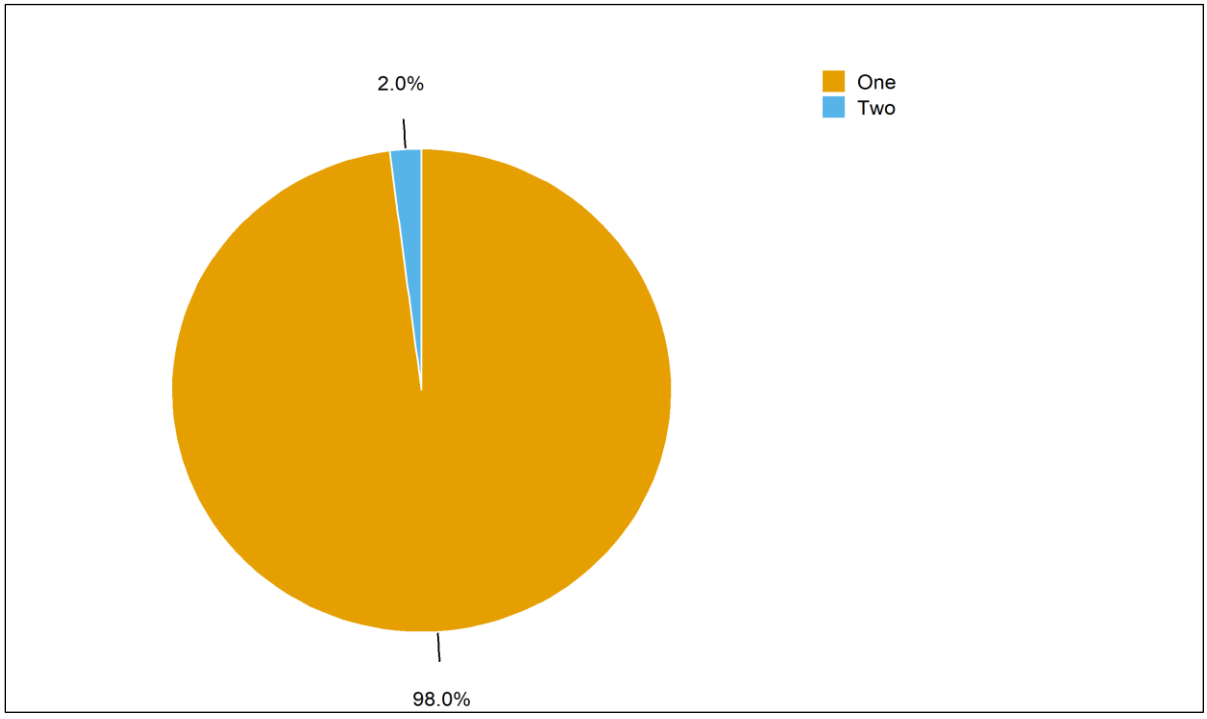
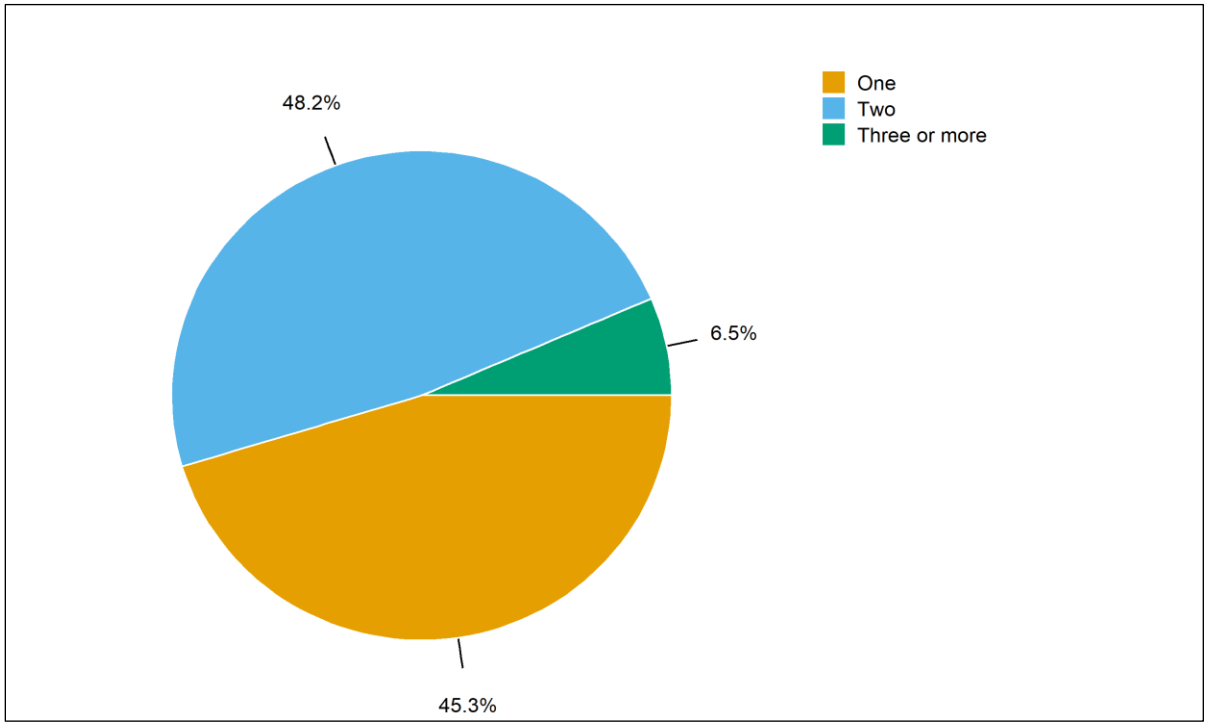


FIGURE 9-5: Calls by Number of Units Arriving – Fire



Observations:

Overall

- OFD units arrived at 1,841 calls (90 percent of total calls).
- On average, 1.2 OFD units arrived at all calls; for 86 percent of calls, only one unit arrived.

EMS

- On average, 1.0 units arrived per EMS call.
- For EMS calls, one unit arrived 98 percent of the time, and two units arrived two percent of the time.

Fire

- On average, 1.6 units arrived per fire call.
- For fire calls, one unit arrived 45 percent of the time, two units arrived 48 percent of the time, and three or more units arrived six percent of the time.
- For outside fire calls, three units arrived 17 percent of the time.
- For structure fire calls, three units arrived 24 percent of the time.

WORKLOAD: RUNS AND TOTAL TIME SPENT

The workload of each OFD unit is measured in two ways: runs and deployed time. The deployed time of a run is measured from the time a unit is dispatched through the time the unit is cleared. Because multiple units respond to some calls, there are more runs (2,494) than calls (2,055) and the average deployed time per run varies from the total duration of calls.

Runs and Deployed Time – All Units

Deployed time, also referred to as deployed hours, is the total deployment time of all units deployed on all runs. Table 9-4 shows the total deployed time, both overall and broken down by type of run, for OFD units between January 1, 2022, and December 31, 2022. Table 9-5 and Figure 9-6 present the average deployed minutes by hour of day.

TABLE 9-4: Annual Runs and Deployed Time by Run Type

Run Type	Minutes per Run	Annual Hours	Percent of Hours	Minutes per Day	Annual Runs	Runs per Day
False alarm	16.1	73.5	9.4	12.1	274	0.8
Good intent	13.6	21.8	2.8	3.6	96	0.3
Hazard	27.9	44.1	5.7	7.3	95	0.3
MVA	25.0	18.4	2.4	3.0	44	0.1
Outside fire	21.4	22.8	2.9	3.7	64	0.2
Public service	30.8	51.8	6.7	8.5	101	0.3
Structure fire	64.9	70.3	9.0	11.6	65	0.2
Fire Subtotal	**24.6**	**302.6**	**38.9**	**49.7**	**739**	**2.0**
EMS	**16.8**	**400.7**	**51.5**	**65.9**	**1,427**	**3.9**
Aid given	34.8	54.5	7.0	9.0	94	0.3
Canceled	5.1	19.9	2.6	3.3	234	0.6
Other Subtotal	**13.6**	**74.4**	**9.6**	**12.2**	**328**	**0.9**
Total	**18.7**	**777.7**	**100.0**	**127.8**	**2,494**	**6.8**

Observations:

Overall

- The total deployed time for the year was 777.7 hours. The daily average was 127.8 minutes for all units combined.
- There were 2,494 runs, including 94 runs dispatched for aid given calls and 234 runs dispatched for canceled calls. The daily average was 6.8 runs.

EMS

- EMS runs accounted for 52 percent of the total workload.
- The average deployed time for EMS runs was 16.8 minutes. The deployed time for all EMS runs averaged 65.9 minutes per day.

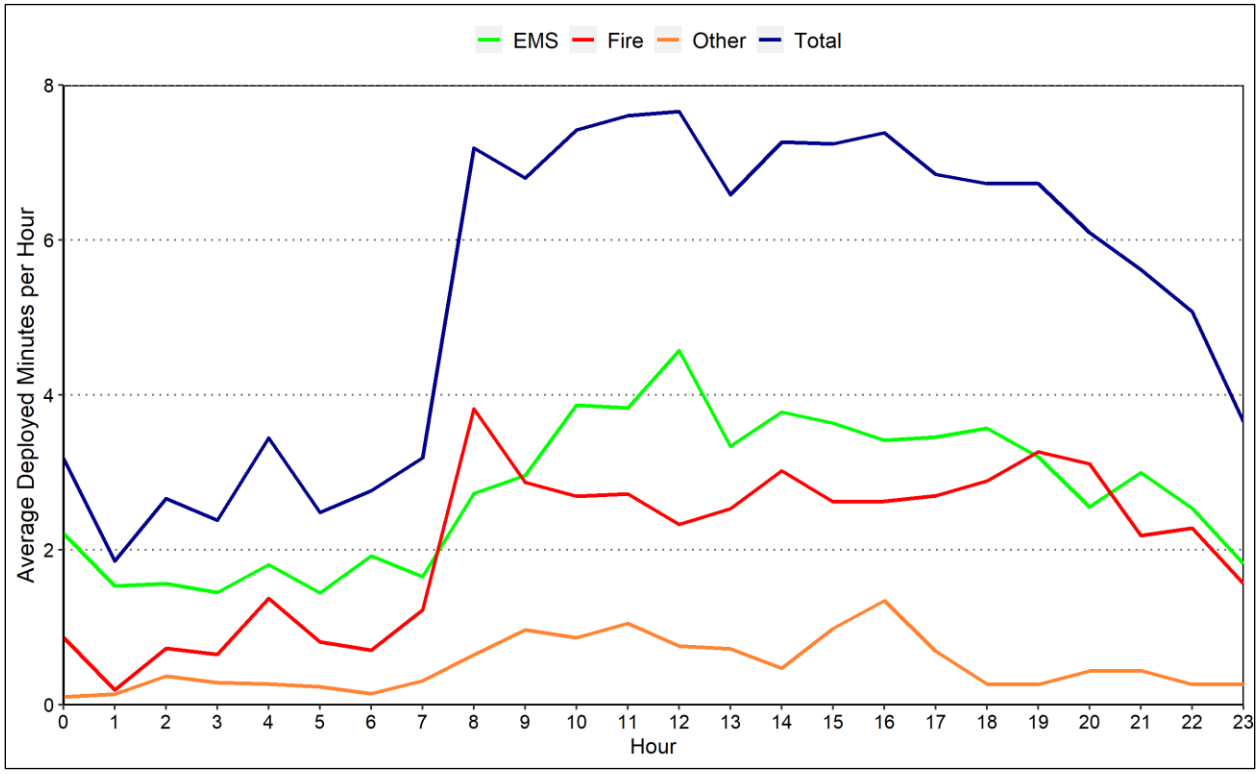
Fire

- Fire runs accounted for 39 percent of the total workload.
- The average deployed time for fire runs was 24.6 minutes. The deployed time for all fire runs averaged 49.7 minutes per day.
- There were 129 runs for structure and outside fire calls combined, with a total workload of 93.1 hours. This accounted for 12 percent of the total workload.
- The average deployed time for outside fire runs was 21.4 minutes per run, and the average deployed time for structure fire runs was 64.9 minutes per run.

TABLE 9-5: Average Deployed Minutes by Hour of Day

Hour	EMS	Fire	Other	Total
0	2.2	0.9	0.1	3.2
1	1.5	0.2	0.1	1.9
2	1.6	0.7	0.4	2.7
3	1.4	0.6	0.3	2.4
4	1.8	1.4	0.3	3.4
5	1.4	0.8	0.2	2.5
6	1.9	0.7	0.1	2.8
7	1.7	1.2	0.3	3.2
8	2.7	3.8	0.6	7.2
9	3.0	2.9	1.0	6.8
10	3.9	2.7	0.9	7.4
11	3.8	2.7	1.0	7.6
12	4.6	2.3	0.8	7.7
13	3.3	2.5	0.7	6.6
14	3.8	3.0	0.5	7.3
15	3.6	2.6	1.0	7.2
16	3.4	2.6	1.3	7.4
17	3.5	2.7	0.7	6.8
18	3.6	2.9	0.3	6.7
19	3.2	3.3	0.3	6.7
20	2.6	3.1	0.4	6.1
21	3.0	2.2	0.4	5.6
22	2.5	2.3	0.3	5.1
23	1.8	1.6	0.3	3.7
Daily Avg.	**65.9**	**49.7**	**12.2**	**127.8**

FIGURE 9-6: Average Deployed Minutes by Hour of Day



Observations:

- Hourly deployed time was highest during the day from 8:00 a.m. to 8:00 p.m., averaging more than 6.6 minutes.
- Average deployed time peaked between noon and 1:00 p.m., averaging 7.7 minutes.
- Average deployed time was the lowest between 1:00 a.m. and 2:00 a.m., averaging 1.9 minutes.

Workload by Unit

Table 9-6 summarizes the annual workload of OFD units. Tables 9-7 and 9-8 provide a more detailed view of the workload for each unit, showing each unit's runs (Table 9-7) and the resulting daily average deployed time (Table 9-8) by run type.

TABLE 9-6: Annual Workload by Unit

Unit	Unit Type	Minutes per Run	Total Hours	Total Percent	Minutes per Day	Total Runs	Runs per Day
BR1	Brush	31.0	34.1	4.4	5.6	66	0.2
Eagle 1	Drone	155.3	12.9	1.7	2.1	5	0.0
Eagle 2	Drone	103.7	10.4	1.3	1.7	6	0.0
Engine 1	Engine	18.7	293.1	37.7	48.2	942	2.6
Engine 2	Engine	15.9	188.4	24.2	31.0	709	1.9
Engine 3	Reserve engine	21.3	82.9	10.7	13.6	234	0.6
Squad 1	Squad	18.0	129.9	16.7	21.3	433	1.2
Tower 1	Tower	36.8	1.2	0.2	0.2	2	0.0
Utility 2	Utility	15.3	24.7	3.2	4.1	97	0.3
Total		**18.7**	**777.7**	**100.0**	**127.8**	**2,494**	**6.8**

TABLE 9-7: Annual Runs by Unit and Type

Unit	False Alarm	Good Intent	Hazard	MVA	Outside Fire	Public Service	Structure Fire	EMS	Cancel	Aid given	Total
BR1	10	4	1	0	9	1	3	17	1	20	66
Eagle 1	0	0	0	0	0	4	0	0	0	1	5
Eagle 2	0	0	0	0	0	4	0	0	0	2	6
Engine 1	131	39	50	22	26	45	27	492	77	33	942
Engine 2	98	25	31	12	19	23	24	378	80	19	709
Engine 3	27	4	9	6	4	3	4	157	15	5	234
Squad 1	5	2	2	4	2	8	6	341	53	10	433
Tower 1	0	0	0	0	1	1	0	0	0	0	2
Utility 2	3	22	2	0	3	12	1	42	8	4	97
Total	**274**	**96**	**95**	**44**	**64**	**101**	**65**	**1,427**	**234**	**94**	**2,494**

TABLE 9-8: Deployed Minutes per Day by Unit and Run Type

Unit	False Alarm	Good Intent	Hazard	MVA	Outside Fire	Public Service	Structure Fire	EMS	Cancel	Aid Given	Total
BR1	0.3	0.1	0.2	0.0	0.5	0.1	1.0	0.8	0.0	2.6	5.6
Eagle 1	0.0	0.0	0.0	0.0	0.0	1.5	0.0	0.0	0.0	0.6	2.1
Eagle 2	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	0.0	0.4	1.7
Engine 1	6.0	1.6	3.9	1.7	1.7	2.7	3.8	23.4	1.2	2.1	48.2
Engine 2	3.4	1.0	1.8	0.7	0.9	1.8	2.4	17.0	1.1	0.7	31.0
Engine 3	1.5	0.2	1.1	0.5	0.2	0.1	1.1	7.5	0.2	1.2	13.6
Squad 1	0.6	0.1	0.1	0.1	0.2	1.0	3.1	15.3	0.6	0.3	21.3
Tower 1	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.2
Utility 2	0.3	0.5	0.1	0.0	0.1	0.1	0.2	1.8	0.2	0.9	4.1
Total	**12.1**	**3.6**	**7.3**	**3.0**	**3.7**	**8.5**	**11.6**	**65.9**	**3.3**	**9.0**	**127.8**

Observations:

- Engine 1 made the most runs (942 or an average of 2.6 runs per day) and had the highest total annual deployed time (293.1 hours or an average of 48.2 minutes per day).
  - EMS calls accounted for 52 percent of runs and 49 percent of the total deployed time.
  - Structure and outside fire calls accounted for six percent of runs and 12 percent of the total deployed time.
- Engine 2 made the second most runs (709 or an average of 1.9 runs per day) and had the second-highest total annual deployed time (188.4 hours or an average of 31.0 minutes per day).
  - EMS calls accounted for 53 percent of runs and 55 percent of the total deployed time.
  - Structure and outside fire calls accounted for six percent of runs and 11 percent of the total deployed time.

Workload by Fire Zone

Table 9-9 breaks down the workload of OFD by the fire zone where the calls occurred. Table 9-10 provides further detail on the workload associated with structure and outside fire calls, also broken down by fire zone.

TABLE 9-9: Annual Workload by Zone

Zone	Calls	Percent Calls	Runs	Runs Per Day	Minutes Per Run	Work Hours	Percent Work	Minutes Per Day
North	889	43.3	1,102	3.0	21.2	389.4	50.1	64.0
South	1,090	53.0	1,298	3.6	15.4	333.8	42.9	54.9
Internal Subtotal	**1,979**	**96.3**	**2,400**	**6.6**	**18.1**	**723.2**	**93.0**	**118.9**
Cutler Fire	6	0.3	11	0.0	15.2	2.8	0.4	0.5
LOH Fire	43	2.1	54	0.1	30.5	27.5	3.5	4.5
Northwest Fire 1	6	0.3	6	0.0	42.4	4.2	0.5	0.7
Ohio Fire	2	0.1	2	0.0	10.2	0.3	0.0	0.1
Pottawatomie Fire	1	0.0	1	0.0	3.9	0.1	0.0	0.0
Richmond Fire	6	0.3	6	0.0	31.7	3.2	0.4	0.5
Wellsville Fire	7	0.3	7	0.0	30.2	3.5	0.5	0.6
Williamsburg Fire	5	0.2	7	0.0	110.3	12.9	1.7	2.1
External Subtotal	**76**	**3.7**	**94**	**0.3**	**34.8**	**54.5**	**7.0**	**9.0**
Total	**2,055**	**100.0**	**2,494**	**6.8**	**18.7**	**777.7**	**100.0**	**127.8**

TABLE 9-10: Runs for Structure and Outside Fires by Zone

Zone	Structure Fires		Outside Fires		Combined	
	Runs	Minutes per Run	Runs	Minutes per Run	Annual Hours	Percent Work
North	46	79.6	37	23.8	75.7	60.5
South	19	29.2	27	17.9	17.3	13.8
Internal Subtotal	**65**	**64.9**	**64**	**21.4**	**93.1**	**74.3**
LOH Fire	10	80.8	8	64.1	22.0	17.6
Northwest Fire 1	1	107.0	0	NA	1.8	1.4
Richmond Fire	0	NA	1	131.1	2.2	1.8
Wellsville Fire	2	81.7	0	NA	2.7	2.2
Williamsburg Fire	2	85.7	1	28.4	3.3	2.6
External Subtotal	**15**	**83.3**	**10**	**67.3**	**32.0**	**25.6**
Total	**80**	**68.3**	**74**	**27.6**	**125.1**	**100.0**

Observations:

OFD North

- There were 889 calls or 43 percent of the total calls in OFD's North zone.
- There were 1,102 runs, including 51 runs dispatched for canceled calls. The daily average was 3.0 runs.
- The total deployed time for the year was 389.4 hours or 50 percent of the total annual workload. The daily average was 64.4 minutes for all units combined.

OFD South

- There were 1,090 calls or 53 percent of the total calls in OFD's South zone.
- There were 1,298 runs, including 183 runs dispatched for canceled calls. The daily average was 3.6 runs.
- The total deployed time for the year was 333.8 hours or 43 percent of the total annual workload. The daily average was 54.9 minutes for all units combined.

Outside OFD's Zones

- There were 76 aid given calls (of which 18 were canceled) or four percent of the total calls.
- There were 94 runs, including 22 runs dispatched for canceled calls. The daily average was 0.3 runs.
- The total deployed time for the year was 54.5 hours or seven percent of the total annual workload. The daily average was 9.0 minutes for all units combined.

ANALYSIS OF BUSIEST HOURS

For the 2,055 calls that were responded to by OFD between January 1, 2022, and December 31, 2022, there is significant variability in the number of calls from hour to hour. One special concern relates to the resources available for hours with the heaviest workload. We tabulated the data for each of the 8,760 hours in the year. Table 9-11 shows the number of hours in the year in which there were zero to three or more calls during the hour. Table 9-12 shows the 10 one-hour intervals which had the most calls during the year. Table 9-13 examines the number of times a call overlapped with another call responded to by OFD units.

TABLE 9-11: Frequency Distribution of the Number of Calls

Calls in an Hour	Frequency	Percentage
0	6,972	79.6
1	1,552	17.7
2	208	2.4
3+	28	0.3
Total	**8,760**	**100.0**

TABLE 9-12: Top 10 Hours with the Most Calls Received

Hour	Number of Calls	Number of Runs	Deployed Hours
9/3/2022, 7:00 p.m. to 8:00 p.m.	4	6	1.3
6/3/2022, 10:00 a.m. to 11:00 a.m.	4	4	0.6
7/18/2022, 9:00 a.m. to 10:00 a.m.	4	4	0.3
7/24/2022, 7:00 p.m. to 8:00 p.m.	3	7	1.2
5/17/2022, 7:00 p.m. to 8:00 p.m.	3	6	0.8
10/29/2022, noon to 1:00 p.m.	3	5	2.0
1/11/2022, 3:00 p.m. to 4:00 p.m.	3	5	1.6
11/21/2022, 1:00 p.m. to 2:00 p.m.	3	5	1.5
5/25/2022, noon to 1:00 p.m.	3	5	1.3
12/24/2022, noon to 1:00 p.m.	3	5	1.1

Note: Total deployed hours is a measure of the total time spent responding to calls received in the hour and may extend into the next hour or hours. The number of runs and deployed hours were calculated based on all response units.

TABLE 9-13: Frequency of Overlapping Calls

Scenario	Number of Calls	Percent of All Calls	Total Hours
No overlapped call	1,930	93.9	587.6
Overlapped with one call	121	5.9	24.9
Overlapped with two calls	4	0.2	0.9

Observations:

- During 28 hours (0.3 percent of all hours), three or more calls occurred; in other words, the department responded to three or more calls in an hour roughly once every 13 days.
- The highest number of calls to occur in an hour was four, which happened three times.
- The total overlap time was 25.8 hours.

RESPONSE TIME

In this part of the analysis, we present response time statistics for different call types. We separate response time into its identifiable components. *Dispatch time* is the difference between the time a call is received and the time the fire station is assigned. Dispatch time includes call processing time, which is the time required to determine the nature of the emergency and the types of resources to dispatch. *Turnout time* is the difference between dispatch time and the time a unit is assigned en route to a call's location. *Travel time* is the difference between the time en route and arrival on scene. *Response time* is the total time elapsed between receiving a call to arriving on scene.

In this analysis, we included all calls responded to by non-administrative OFD units while excluding canceled and aid given. In addition, calls with a total response time of more than 30 minutes were excluded. Finally, we focused on units that had complete time stamps, that is, units with all components recorded, so that we could calculate each segment of response time.

Based on the methodology above, for 2,055 calls (Table 9-1), we excluded 216 canceled calls, 76 aid given calls, 22 calls where no units recorded a valid on-scene time, and 14 calls with a total response time exceeding 30 minutes. As a result, in this section, a total of 1,727 calls are included in the analysis.

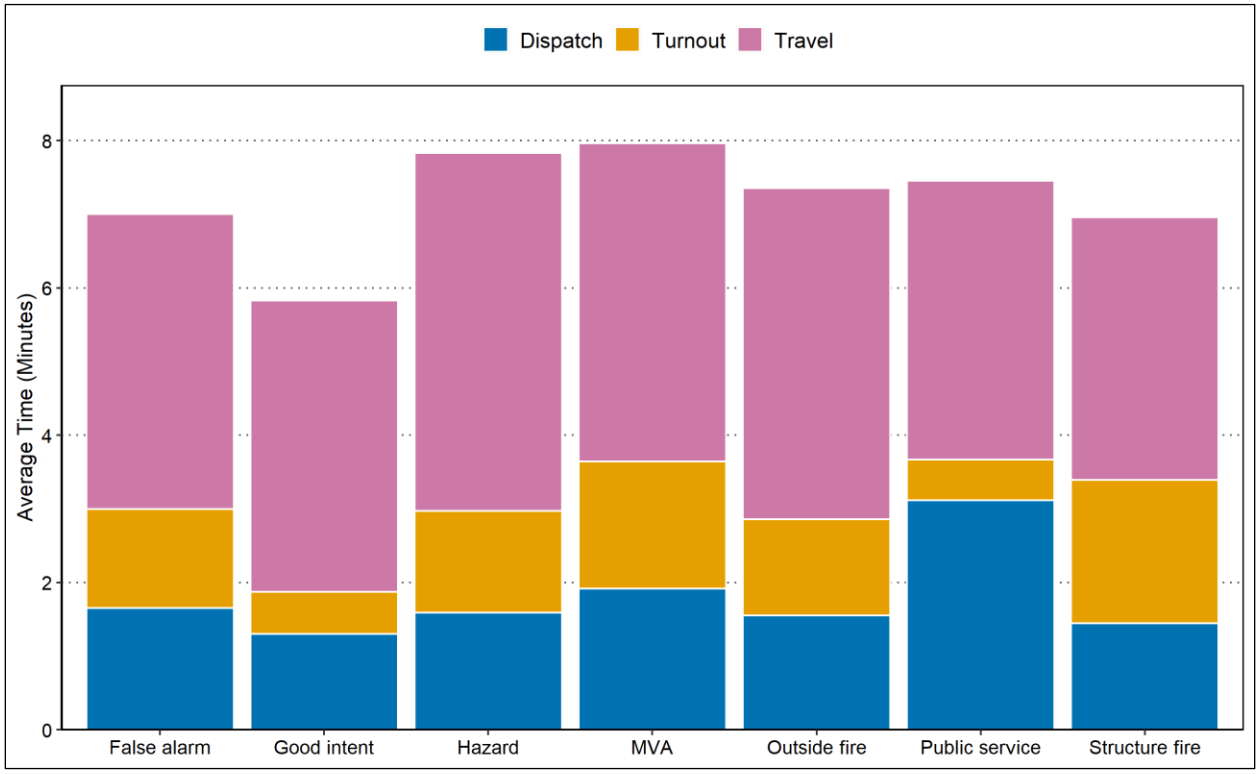
Response Time by Type of Call

Table 9-14 breaks down the average and 90th percentile dispatch, turnout, travel, and total response times by call type. A 90th percentile means that 90 percent of calls had response times at or below that number. For example, the table shows an overall 90th percentile response time of 10.6 minutes, which means that 90 percent of the time, a call had a response time of no more than 10.6 minutes. Figure 9-7 illustrates the average response time for each type of fire call.

TABLE 9-14: Average and 90th Percentile Response Time of First Arriving Unit, by Call Type

Call Type	Average Response Time, Min.				90th Percentile Response Time, Min.				Call Count
	Dispatch	Turnout	Travel	Total	Dispatch	Turnout	Travel	Total	
False alarm	1.7	1.3	4.0	7.0	2.3	2.2	6.7	9.9	137
Good intent	1.3	0.6	4.0	5.8	2.4	2.0	6.7	10.0	66
Hazard	1.6	1.4	4.9	7.8	3.0	2.3	7.4	11.3	55
MVA	1.9	1.7	4.3	8.0	4.0	2.5	7.2	12.3	26
Outside fire	1.5	1.3	4.5	7.4	2.8	2.3	7.6	12.2	29
Public service	3.1	0.6	3.8	7.5	8.3	1.8	8.4	17.6	65
Structure fire	1.4	1.9	3.6	7.0	2.3	2.9	5.3	8.3	27
Fire Subtotal	**1.8**	**1.2**	**4.1**	**7.1**	**3.0**	**2.3**	**6.8**	**10.9**	**405**
EMS	**1.5**	**1.6**	**4.8**	**7.9**	**2.3**	**2.6**	**7.1**	**10.6**	**1,322**
Total	**1.6**	**1.5**	**4.6**	**7.7**	**2.4**	**2.6**	**7.1**	**10.6**	**1,727**

FIGURE 9-7: Average Response Time of First Arriving Unit, by Fire Call Type



Observations:

- The average dispatch time was 1.6 minutes.
- The average turnout time was 1.5 minutes.
- The average travel time was 4.6 minutes.
- The average total response time was 7.7 minutes.
- The average response time was 7.9 minutes for EMS calls and 7.1 minutes for fire calls.
- The average response time was 7.4 minutes for outside fires and 7.0 minutes for structure fires.
- The 90th percentile dispatch time was 2.4 minutes.
- The 90th percentile turnout time was 2.6 minutes.
- The 90th percentile travel time was 7.1 minutes.
- The 90th percentile total response time was 10.6 minutes.
- The 90th percentile response time was 10.6 minutes for EMS calls and 10.9 minutes for fire calls.
- The 90th percentile response time was 12.2 minutes for outside fires and 8.3 minutes for structure fires.

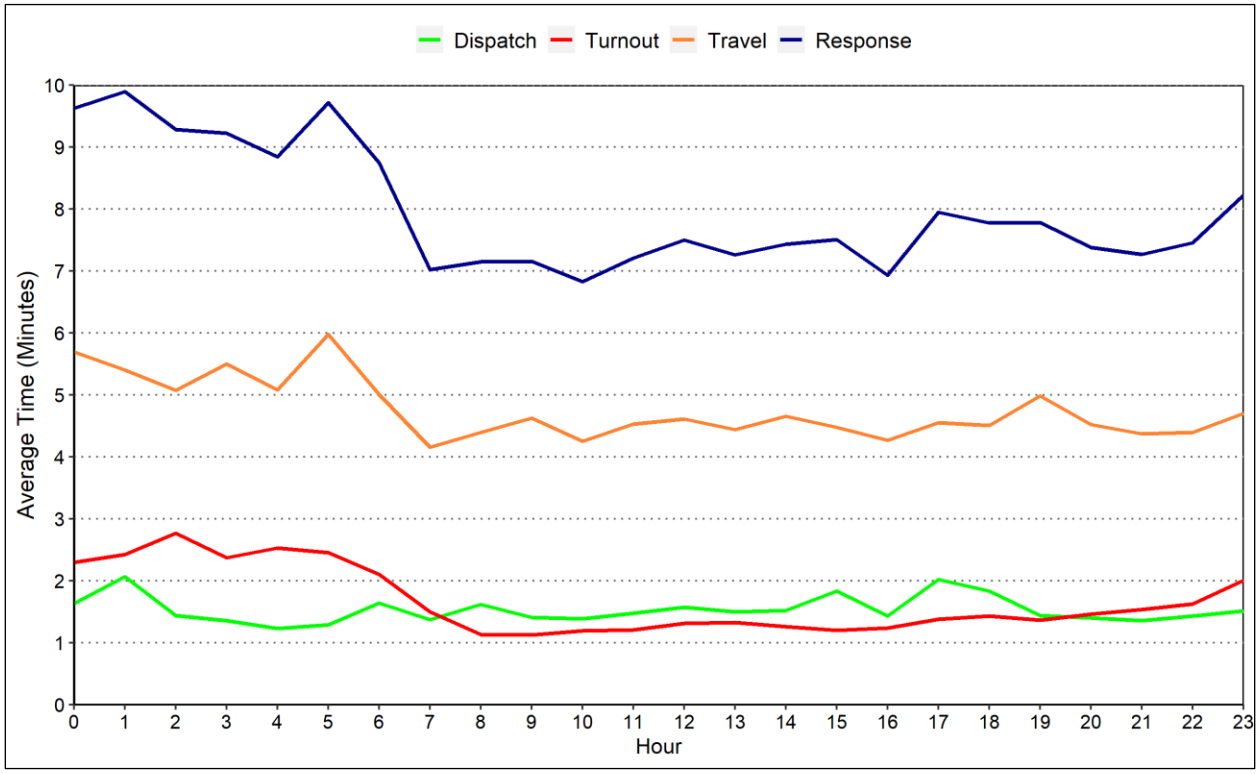
Response Time by Hour

Table 9-15 shows the average response time by the time of day. The table also shows 90th percentile response times. Figure 9-8 shows the average response time by the time of day.

TABLE 9-15: Average and 90th Percentile Response Time of First Arriving Unit, by Hour of Day

Hour	Minutes					Number of Calls
	Dispatch	Turnout	Travel	Response Time	90th Percentile Response Time	
0	1.6	2.3	5.7	9.6	12.0	41
1	2.1	2.4	5.4	9.9	12.3	31
2	1.4	2.8	5.1	9.3	11.8	33
3	1.4	2.4	5.5	9.2	11.8	35
4	1.2	2.5	5.1	8.8	11.2	37
5	1.3	2.5	6.0	9.7	11.8	28
6	1.6	2.1	5.0	8.7	11.1	53
7	1.4	1.5	4.2	7.0	10.1	51
8	1.6	1.1	4.4	7.1	10.3	83
9	1.4	1.1	4.6	7.2	9.6	88
10	1.4	1.2	4.3	6.8	10.5	102
11	1.5	1.2	4.5	7.2	10.1	102
12	1.6	1.3	4.6	7.5	10.2	118
13	1.5	1.3	4.4	7.3	10.2	89
14	1.5	1.3	4.7	7.4	10.8	90
15	1.8	1.2	4.5	7.5	10.6	107
16	1.4	1.2	4.3	6.9	9.4	81
17	2.0	1.4	4.5	7.9	10.7	101
18	1.8	1.4	4.5	7.8	10.3	103
19	1.4	1.4	5.0	7.8	10.1	88
20	1.4	1.5	4.5	7.4	9.6	71
21	1.4	1.5	4.4	7.3	9.7	83
22	1.4	1.6	4.4	7.5	10.1	57
23	1.5	2.0	4.7	8.2	10.5	55
Total	**1.6**	**1.5**	**4.6**	**7.7**	**10.6**	**1,727**

FIGURE 9-8: Average Response Time of First Arriving Unit, by Hour of Day



Observations:

- Average dispatch time was between 1.2 minutes (4:00 a.m. to 5:00 a.m.) and 2.1 minutes (1:00 a.m. to 2:00 a.m.).
- Average turnout time was between 1.1 minutes (9:00 a.m. to 10:00 a.m.) and 2.8 minutes (2:00 a.m. to 3:00 a.m.).
- Average travel time was between 4.2 minutes (7:00 a.m. to 8:00 a.m.) and 6.0 minutes (5:00 a.m. to 6:00 a.m.).
- Average response time was between 6.8 minutes (10:00 a.m. to 11:00 a.m.) and 9.9 minutes (1:00 a.m. to 2:00 a.m.).
- The 90th percentile response time was between 9.4 minutes (4:00 p.m. to 5:00 p.m.) and 12.3 minutes (1:00 a.m. to 2:00 a.m.).

Response Time Distribution

Here, we present a more detailed look at how response times to calls are distributed. The cumulative distribution of total response time for the first arriving unit to EMS calls is shown in Figure 9-9 and Table 9-16. Figure 9-9 shows response times for the first arriving unit to EMS calls as a frequency distribution in whole-minute increments, and Figure 9-10 shows the same for the first arriving unit to outside and structure fire calls.

The cumulative percentages here are read in the same way as a percentile. In Figure 9-9, the 90th percentile of 10.6 minutes means that 90 percent of EMS calls had a response time of 10.6 minutes or less. In Table 9-16, the cumulative percentage of 57.8 and 80.4, for example, means that 57.8 percent of EMS calls and 80.4 percent of outside and structure fire calls had a response time under 8 minutes.

FIGURE 9-9: Cumulative Distribution of Response Time, First Arriving Unit, EMS

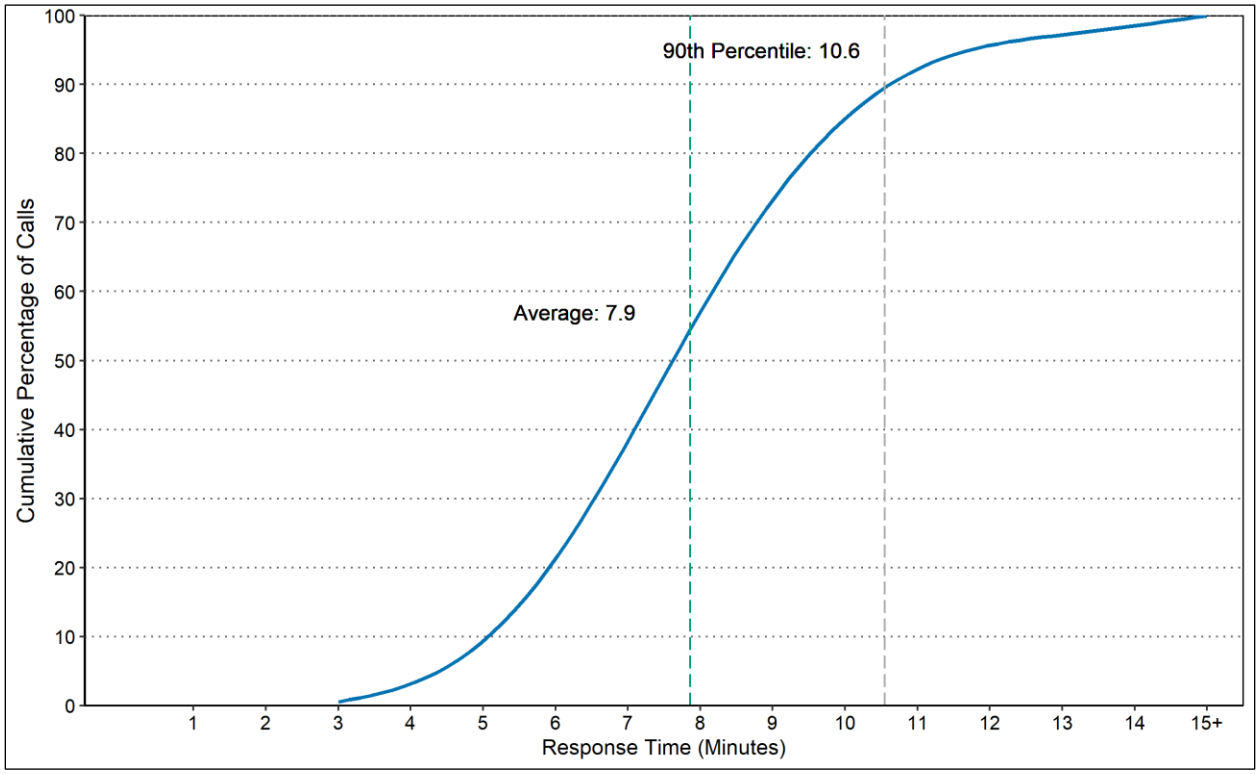


FIGURE 9-10: Cumulative Distribution of Response Time, First Arriving Unit, Outside and Structure Fires

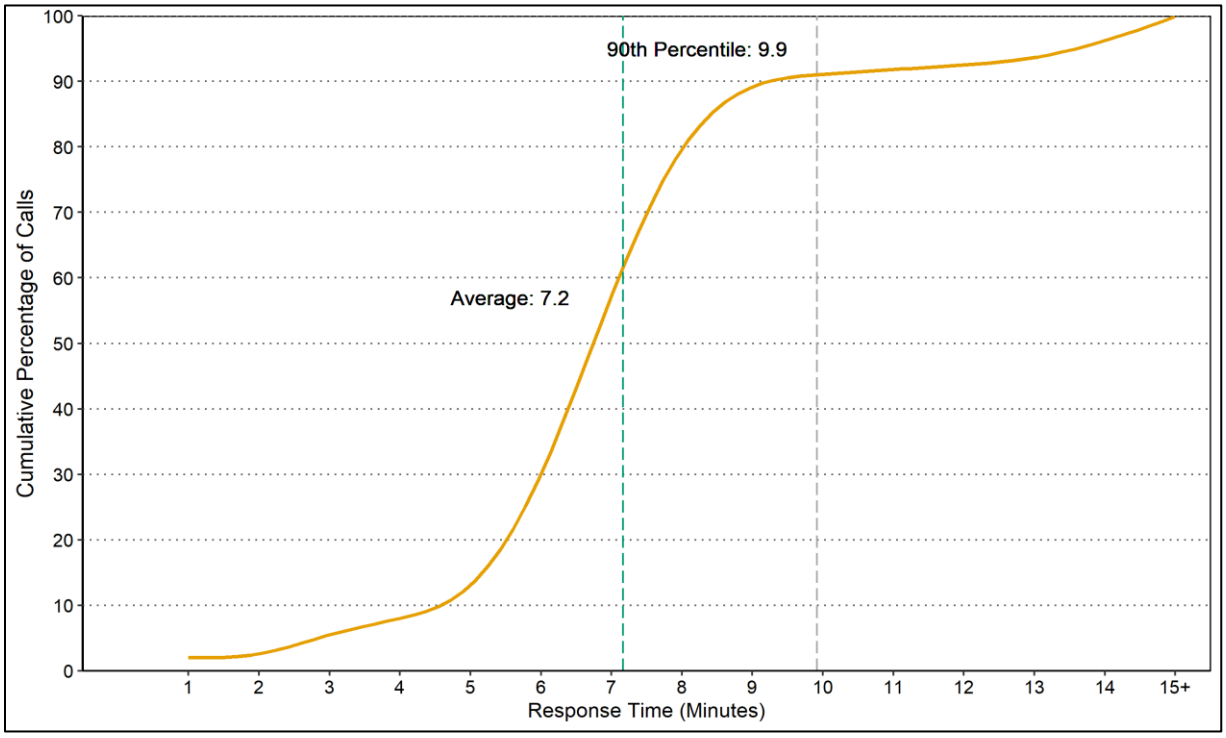


TABLE 9-16: Cumulative Distribution of Response Time, First Arriving Unit

Response Time (minute)	EMS		Outside and Structure Fires	
	Frequency	Cumulative Percentage	Frequency	Cumulative Percentage
1	0	0.0	1	1.8
2	1	0.1	1	3.6
3	5	0.5	0	3.6
4	39	3.4	4	10.7
5	70	8.7	0	10.7
6	169	21.5	11	30.4
7	214	37.7	15	57.1
8	266	57.8	13	80.4
9	201	73.0	5	89.3
10	165	85.5	1	91.1
11	87	92.1	0	91.1
12	49	95.8	1	92.9
13	20	97.3	1	94.6
14	11	98.1	0	94.6
15+	25	100.0	3	100.0

Response Time by Fire Zone

Here, we detail the average and 90th percentile response times to calls that occurred in the north and south fire zones. The result is summarized in the following table.

TABLE 9-17: Average and 90th Percentile Response Time of First Arriving Unit, by Area

Fire Zone	Average Response Time, Min.				90th Percentile Response Time, Min.				Call Count
	Dispatch	Turnout	Travel	Total	Dispatch	Turnout	Travel	Total	
North	1.5	1.4	4.0	7.0	2.3	2.6	6.3	9.7	829
South	1.6	1.5	5.2	8.3	2.4	2.5	7.4	11.2	898
Total	**1.6**	**1.5**	**4.6**	**7.7**	**2.4**	**2.6**	**7.1**	**10.6**	**1,727**

Observations:

- The average and 90th percentile response times of calls within the OFD's South zone were 19 and 15 percent greater than those within the OFD's North zone, respectively.

TABLE 9-18: Workload of Administrative Units

Unit	Unit Type	Annual Hours	Annual Runs
307 Matthias	Fire Chief	28.2	50
316 Dillon	Assistant Chief	41.7	47
Total		**69.9**	**97**

ATTACHMENT II: ACTIONS TAKEN

TABLE 9-19: Actions Taken Analysis for Structure and Outside Fire Calls

Action Taken	Number of Calls	
	Outside Fire	Structure Fire
Control fire (wildland)	1	0
Enforce codes	1	0
Extinguishment by fire service personnel	19	14
Fire control or extinguishment, other	0	1
Investigate	11	20
Investigate fire out on arrival	3	3
Notify other agencies	1	0
Remove hazard	1	0
Salvage & overhaul	0	2
Search	0	1
Shut down system	0	1
Ventilate	0	3

Note: Totals are higher than the total number of structure and outside fire calls because some calls recorded multiple actions taken.

Observations:

- Out of 29 outside fires, 19 were extinguished by fire service personnel, which accounted for 66 percent of outside fires.
- Out of 29 structure fires, 14 were extinguished by fire service personnel, which accounted for 48 percent of structure fires.

ATTACHMENT III: FIRE LOSS

TABLE 9-20: Total Fire Loss Above and Below $25,000

Call Type	No Loss	Under $25,000	$25,000 plus	Total
Outside fire	18	9	2	29
Structure fire	16	10	3	29
Total	**34**	**19**	**5**	**58**

TABLE 9-21: Content and Property Loss, Structure and Outside Fires

Call Type	Property Loss		Content Loss	
	Loss Value	Number of Calls	Loss Value	Number of Calls
Outside fire	$186,691	11	$1,950	5
Structure fire	$175,250	11	$63,850	11
Total	**$361,941**	**22**	**$65,800**	**16**

Note: The table includes only fire calls with a recorded loss greater than 0.

Observations:

- 18 outside fires and 16 structure fires had no recorded losses.
- Two outside fires and three structure fires had $25,000 or more in recorded losses.
- Outside fires:
  - The highest total loss for an outside fire was $120,000.
  - The average total loss for all outside fires was $6,505.
  - Five outside fires recorded content loss with a combined $1,950 in losses.
  - Out of 29 outside fires, 11 had recorded property losses, with a combined $186,691 in losses.
- Structure fires:
  - The highest total loss for a structure fire was $77,000.
  - The average total loss for all structure fires was $8,245.
  - 11 structure fires recorded content losses with a combined $63,850 in losses.
  - Out of 29 structure fires, 11 had recorded property losses, with a combined $175,250 in losses.

ATTACHMENT IV: CALL TYPE IDENTIFICATION

When available, NFIRS data serves as our primary source for assigning call categories. For the 1,979 non-aid given calls inside OFD jurisdictions, NFIRS incident type codes were used to assign call types for canceled, EMS, fire, and motor vehicle accident (MVA) calls. The following table summarizes the method used to identify call types. The 76 aid given calls were not included. The types of calls without available NFIRS incident type codes were identified based on the nature description of the calls in the CAD data.

TABLE 9-22: Call Type by NFIRS Incident Type Code and Description

Call Type	NFIRS Code	Description	Call Count
Canceled	611	Dispatched and canceled en route	195
	621	Wrong location	21
Emergency Medical Service	311	Medical assist	818
	321	EMS call	300
	350	Extrication, rescue, other (CAD nature – Medical)	2
	352	Extrication of victim(s) from vehicle (CAD nature - Injury)	2
	661	EMS call where injured party has been transported by a non-fire service agency or left the scene prior to arrival	212
	NA	CAD nature - Medical	7
False Alarm	700	False alarm or false call, other	1
	710	Malicious, mischievous false alarm, other	1
	714	Central station, malicious false alarm	1
	731	Sprinkler activated due to the failure or malfunction	2
	733	Smoke detector activation due to malfunction	22
	735	Alarm system sounded due to malfunction	12
	736	CO detector activation due to malfunction	7
	741	Sprinkler activation, no fire - unintentional	5
	743	Smoke detector activation, no fire - unintentional	32
	744	Detector activation, no fire - unintentional	7
	745	Alarm system activation (no fire) - unintentional	46
	746	Carbon monoxide detector activation (no CO)	5
Good Intent	600	Good intent call, other	7
	631	Authorized controlled burning	27
	651	Smoke scare, odor of smoke, not steam	20
	652	Steam, vapor, fog, or dust thought to be smoke	3
	671	Hazardous material release investigation	10
Hazard	251	Excessive heat, overheat scorch burns with no ignition	1
	411	Gasoline or other flammable liquid spill	1
	412	Gas leak (natural gas or LPG)	9
	413	Oil or other combustible liquid spill	1
	422	Chemical spill or leak	4
	424	Carbon monoxide incident	3

Call Type	NFIRS Code	Description	Call Count
	441	Heat from short circuit, defective or worn insulation	4
	444	Power line down	17
	445	Arcing, shorted electrical equipment	8
	462	Aircraft standby	7
Motor Vehicle Accident	322	Motor vehicle accident with injuries	16
	323	Motor vehicle/pedestrian accident	2
	324	Motor vehicle accident with no injuries	9
Outside Fire	131	Passenger vehicle fire	9
	132	Road freight or transport vehicle fire	1
	137	Camper or recreational vehicle (RV) fire	1
	138	Off-road vehicle or heavy equipment fire	1
	140	Natural vegetation fire, other	3
	142	Brush or brush-and-grass mixture fire	1
	143	Grass fire	7
	151	Outside rubbish, trash or waste fire	4
	153	Construction or demolition landfill fire	1
	154	Dumpster or other outside trash receptacle fire	1
Public Service	500	Service call, other	1
	510	Person in distress, other	1
	512	Ring or jewelry removal, without transport to hospital	1
	520	Water problem, other	1
	531	Smoke or odor removal	2
	542	Animal rescue	1
	550	Public service assistance, other	1
	551	Assist police or other governmental agency	16
	553	Removal of victim(s) from stalled elevator	24
	555	Defective elevator, no occupants	1
	561	Unauthorized burning	22
	NA	Cad nature – Fight (1), Traffic stop (1), and Welfare CHK	3
Structure Fire	100	Fire, other	1
	111	Building fire	13
	113	Cooking fire	10
	114	Chimney or flue fire	1
	118	Trash or rubbish fire in a structure	4
Total			**1,979**

- END -